

GenCore version 5.1.6
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OM protein - protein search, using sw model

Run on: February 14, 2005, 14:48:56 ; Search time 172 Seconds
(without alignments)
1466.092 Million cell updates/sec

Title: US-10-614-076-98

Perfect score: 3406

Sequence: 1 MNPNNRSEHDTIKVTPNSL.....SPVSNKIVDKIEPIPVQL 652

Scoring table: BLOSUM62

Gapop 10.0 , Gapext 0.5

Searched: 2105692 seqs, 386760381 residues

Total number of hits satisfying chosen parameters: 2105692

Minimum DB seq length: 0

Maximum DB seq length: 2000000000

Post-processing: Minimum Match 0%

Maximum Match 100%

Listing first 150 summaries

Database :

A_Geneseq_16Dec04:*

1: Geneseqp1980s:*

2: Geneseqp1990s:*

3: Geneseqp2000s:*

4: Geneseqp2001s:*

5: Geneseqp2002s:*

6: Geneseqp2003as:*

7: Geneseqp2003bs:*

8: Geneseqp2004s:*

Pred. No. is the number of results predicted by chance to have a score greater than or equal to the score of the result being printed, and is derived by analysis of the total score distribution.

SUMMARIES

Result No.	Score	Query Match	Length	ID	Description
1	3406	100.0	652	AA14047	Aar14047 B.thuring
2	3406	100.0	652	AAV23207	Aay23207 Amino aci
3	3406	100.0	652	AAV23212	Aay23212 Amino aci
4	3406	100.0	652	AAV70441	Aay70441 Bacillus
5	3406	100.0	652	ABU09192	Abu09192 Bacillus
6	3406	100.0	652	ABW01050	Abw01050 Bacillus
7	3406	100.0	652	ADR89425	Adr89425 cry3Bb. 1
8	3402	99.9	652	AAV23205	Aay23205 Amino aci
9	3401	99.9	652	AAV23178	Aay23178 Amino aci
10	3401	99.9	652	AAV70443	Aay70443 Synthetic
11	3401	99.9	652	ABU09194	Abu09194 Bacillus
12	3401	99.9	652	ABW01052	Abw01052 Bacillus
13	3400	99.8	652	AAV23195	Aay23195 Amino aci
14	3400	99.8	652	AAV23187	Aay23187 Amino aci
15	3399	99.8	652	AAV23193	Aay23193 Amino aci
16	3399	99.8	652	AAV23198	Aay23198 Amino aci
17	3398	99.8	652	AAV23175	Aay23175 Amino aci
18	3398	99.8	652	AAV23184	Aay23184 Amino aci
19	3398	99.8	652	AAV23192	Aay23192 Amino aci
20	3396	99.7	652	AAV23203	Aay23203 Amino aci
21	3395	99.7	652	AAV23177	Aay23177 Amino aci
22	3395	99.7	652	AAV23176	Aay23176 Amino aci
23	3395	99.7	652	AAV23188	Aay23188 Amino aci
24	3393	99.6	652	AAV23181	Aay23181 Amino aci
25	3393	99.6	652	AAV23204	Aay23204 Amino aci

26	3392	99.6	652	AAV23201	Aay23201 Amino aci
27	3392	99.6	652	AAV23186	Aay23186 Amino aci
28	3390	99.5	652	AAV23179	Aay23179 Amino aci
29	3390	99.5	652	AAV23191	Aay23191 Amino aci
30	3390	99.5	652	AAV23180	Aay23180 Amino aci
31	3389	99.5	652	AAV23173	Aay23173 Amino aci
32	3387.5	99.5	651	AAV23197	Aay23197 Amino aci
33	3387	99.4	652	AAV23183	Aay23183 Amino aci
34	3386	99.4	652	AAV23174	Aay23174 Amino aci
35	3386	99.4	652	AAV23185	Aay23185 Amino aci
36	3385	99.4	652	AAV23194	Aay23194 Amino aci
37	3382	99.3	652	AAV23182	Aay23182 Amino aci
38	3380	99.2	652	AAV23190	Aay23190 Amino aci
39	3380	99.2	652	AAV23189	Aay23189 Amino aci
40	3379	99.2	652	AAV23196	Aay23196 Amino aci
41	3377	99.1	652	AAV23172	Aay23172 Amino aci
42	3377	99.1	653	AAV23208	Aay23208 Amino aci
43	3377	99.1	653	AAV70444	Aay70444 Bacillus
44	3377	99.1	653	ABU09195	Abu09195 Bacillus
45	3377	99.1	653	ABU09198	Abu09198 Bacillus
46	3377	99.1	653	ABW01053	Abw01053 Bacillus
47	3375	99.1	652	AAV23209	Aay23209 Amino aci
48	3373	99.0	653	AAV70446	Aay70446 Bacillus
49	3373	99.0	653	ABU09197	Abu09197 Bacillus
50	3373	99.0	653	ABU09202	Abu09202 Bacillus
51	3373	99.0	653	ABW01055	Abw01055 Bacillus
52	3366.5	98.8	651	AAV23199	Aay23199 Amino aci
53	3366	98.8	653	AAV70445	Aay70445 Bacillus
54	3366	98.8	653	ABU09200	Abu09200 Bacillus
55	3366	98.8	653	ABU09196	Abu09196 Bacillus
56	3366	98.8	653	ABW01054	Abw01054 Bacillus
57	3364	98.8	652	AAV23202	Aay23202 Amino aci
58	3361	98.7	652	AAV23211	Aay23211 Amino aci
59	3361	98.7	652	AAV70442	Aay70442 Bacillus
60	3361	98.7	652	ABU09193	Abu09193 Bacillus
61	3361	98.7	652	ABW01051	Abw01051 Bacillus
62	3358.5	98.6	651	AAV23200	Aay23200 Amino aci
63	3212	94.3	651	AAW06460	Aw06460 Bt.PGS1208
64	3212	94.3	651	AAW06419	Aw06419 Antiscara
65	3212	94.3	659	AAV23213	Aay23213 Amino aci
66	3212	94.3	659	ADR89424	Adr89424 cry3Ba. 1
67	3196	93.8	651	ADR33769	Adr33769 Bt isolat
68	3082	90.5	659	AAV232106	Aay232106 Bacillus
69	2867	84.2	572	AAV232574	Aay232574 Sequence
70	2582	75.8	493	AAV23206	Aay23206 Amino aci
71	2344.5	68.8	644	AAW34838	Aw34838 Novel Cry
72	2342.5	68.8	644	AAW34830	Aw34830 Novel Cry
73	2342.5	68.8	644	AAW34836	Aw34836 Novel Cry
74	2341.5	68.7	644	AAV70085	Aay70085 Sequence
75	2341.5	68.7	644	AAV232487	Aay232487 Delta end
76	2341.5	68.7	644	AAV232487	Aay232487 Delta end
77	2341.5	68.7	644	AAV232487	Aay232487 Delta end
78	2341.5	68.7	644	AAV232487	Aay232487 Delta end
79	2341.5	68.7	644	AAV232487	Aay232487 Delta end
80	2341.5	68.7	644	AAV232487	Aay232487 Delta end
81	2341.5	68.7	644	AAV232487	Aay232487 Delta end
82	2341.5	68.7	644	AAV232487	Aay232487 Delta end
83	2341.5	68.7	644	AAV232487	Aay232487 Delta end
84	2341.5	68.7	652	AAV23214	Aay23214 Amino aci
85	2341.5	68.7	652	ADR89423	Adr89423 cry3Aa1.
86	2340.5	68.7	644	AAV234814	Aw34814 Novel Cry
87	2340.5	68.7	644	AAV234839	Aw34839 Novel Cry
88	2340.5	68.7	644	AAV234832	Aw34832 Novel Cry
89	2339.5	68.7	644	AAV234822	Aw34822 Novel Cry
90	2339.5	68.7	644	AAV234817	Aw34817 Novel Cry
91	2338.5	68.7	644	AAV234817	Aw34817 Novel Cry
92	2338.5	68.7	644	AAV234817	Aw34817 Novel Cry
93	2338.5	68.7	644	AAV234817	Aw34817 Novel Cry
94	2338.5	68.7	644	AAV234817	Aw34817 Novel Cry
95	2337.5	68.6	644	AAV234828	Aw34828 Novel Cry
96	2337.5	68.6	644	AAV234834	Aw34834 Novel Cry
97	2336.5	68.6	644	AAV234835	Aw34835 Novel Cry
98	2336.5	68.6	644	AAV234820	Aw34820 Novel Cry

QY 541 LFLKSSNSIAKPKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNDDFLVIYINKTMNK 600
DB 541 LFLKSSNSIAKPKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNDDFLVIYINKTMNK 600
QY 601 DDLLTYQTFLATNSNMFGSGDKNELIIGAESFVSNKEIYIDKIEFIPVOL 652
DB 601 DDLLTYQTFLATNSNMFGSGDKNELIIGAESFVSNKEIYIDKIEFIPVOL 652

RESULT 2
AAV23207
ID AAY23207 standard; protein; 652 AA.
XX
AC AAY23207;
XX
DT 24-AUG-1999 (first entry)
XX
DE Amino acid sequence of the wild type cry3Bb protein.
XX
KW Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
KW coleoptera; southern corn rootworm; western corn root worm;
KW Diabrotica undecimpunctata howardi Barber; transgenic plant;
KW Diabrotica virgifera verigifera LeConte; insecticide resistance.
XX
OS Bacillus thuringiensis.
XX
PN WO9931248-A1.
XX
XX 24-JUN-1999.
XX
XX 17-DEC-1998; 98WO-US026852.
XX
PR 18-DEC-1997; 97US-00993170.
PR 18-DEC-1997; 97US-00993722.
PR 18-DEC-1997; 97US-00993775.
PR 18-DEC-1997; 97US-00996441.
XX
PA (ECOG-) ECOGEN INC.
PA (MONS) MONSANTO CO.
XX
PI English L, Brusseck SM, Malvar TM, Bryson JW, Kulesza CA;
PI Walters FS, Slatin SL, Von Tersch MA, Romano C;
XX
DR WPI; 1999-395184/33.
XX
XX Insecticidal Bacillus thuringiensis proteins.
PS Disclosure; Page 480-482; 512pp; English.
XX
CC AAY23172-Y23206, and AAY23208-X23209 represent new Bacillus thuringiensis
CC Cry3Bb mutant proteins. The specification also describes methods of
CC altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
CC polypeptide was modified to have improved insecticidal activity or
CC enhanced insecticidal specificity against a target insect. The
CC modification comprises at least one amino acid substitution, addition, or
CC deletion in the primary sequence of the native or unmodified Cry3Bb
CC polypeptide, wherein the substitution or deletion occurs at a position
CC corresponding to from about amino acids 1-365 of the unmodified
CC polypeptide sequence (AAV23207 represents the wild type Cry3Bb protein).
CC The polypeptide can be used to kill coleopteran pests, especially by
CC application to the environment. It is especially useful against southern
CC corn rootworm and western corn root worm, (Diabrotica undecimpunctata
CC howardi Barber, and Diabrotica virgifera verigifera LeConte respectively).
CC The mutant cry3Bb polynucleotides can also be used to produce transgenic
CC plants with increased insecticide resistance
XX
SQ Sequence 652 AA;

Query Match 100.0%; Score 3406; DB 2; Length 652;
Best Local Similarity 100.0%; Pred. No. 7.4e-277;
Matches 652; Conservative 0; Mismatches 0; Indels 0; Gaps 0;

QY 1 MNPNNRSEHDTIKVTNPSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSSTEVLDS 60

DB 1 MNPNNRSEHDTIKVTNPSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSSTEVLDS 60
QY 61 TVKDAVGTGIVVVGQILGVGVPPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120
DB 61 TVKDAVGTGIVVVGQILGVGVPPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120
QY 121 KIEEYAKSKALAELOGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRRELFSQAESHFRN 180
DB 121 KIEEYAKSKALAELOGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRRELFSQAESHFRN 180
QY 181 SMPSPAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSSEDVAEPFHRLKLTQQY 240
DB 181 SMPSPAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSSEDVAEPFHRLKLTQQY 240
QY 241 TDHCNVNMYNGLNGLRGSTYDAWVKENFRREMTLVLDLILVLPFYDRLYSKGVKTEL 300
DB 241 TDHCNVNMYNGLNGLRGSTYDAWVKENFRREMTLVLDLILVLPFYDRLYSKGVKTEL 300
QY 301 TRDIFTDFISLNTLQEGYGTFLSIENSIRKPHLPDYLOGIEFHTRLQPGYFGKDSFNW 360
DB 301 TRDIFTDFISLNTLQEGYGTFLSIENSIRKPHLPDYLOGIEFHTRLQPGYFGKDSFNW 360
QY 361 SGNVETREPSIGSSKTIITSPFYGDKASTEPVKLSFDGQKVYRTIANTDVAAPNGKVYLG 420
DB 361 SGNVETREPSIGSSKTIITSPFYGDKASTEPVKLSFDGQKVYRTIANTDVAAPNGKVYLG 420
QY 421 VTKVDFSQYDDQKNETSTQTYDSKRNGHVSAQDSIDQLPPTTDRPLEKAYSHQLNYAE 480
DB 421 VTKVDFSQYDDQKNETSTQTYDSKRNGHVSAQDSIDQLPPTTDRPLEKAYSHQLNYAE 480
QY 481 CFLMQDRRGCTIPFFTWTHRSVDFNTIDAEKITQLPVPVKAYALSSGASIEGPGFTGGNL 540
DB 481 CFLMQDRRGCTIPFFTWTHRSVDFNTIDAEKITQLPVPVKAYALSSGASIEGPGFTGGNL 540
QY 541 LFLKSSNSIAKPKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNDDFLVIYINKTMNK 600
DB 541 LFLKSSNSIAKPKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNDDFLVIYINKTMNK 600
QY 601 DDLLTYQTFLATNSNMFGSGDKNELIIGAESFVSNKEIYIDKIEFIPVOL 652
DB 601 DDLLTYQTFLATNSNMFGSGDKNELIIGAESFVSNKEIYIDKIEFIPVOL 652

RESULT 3
AAV23212
ID AAY23212 standard; protein; 652 AA.
XX
AC AAY23212;
XX
DT 24-AUG-1999 (first entry)
XX
DE Amino acid sequence of Cry3Bb protein.
XX
KW Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
KW coleoptera; southern corn rootworm; western corn root worm; Cry3BB;
KW Diabrotica undecimpunctata howardi Barber; transgenic plant;
KW Diabrotica virgifera verigifera LeConte; insecticide resistance.
XX
OS Bacillus thuringiensis.
XX
PN WO9931248-A1.
XX
PD 24-JUN-1999.
XX
PF 17-DEC-1998; 98WO-US026852.
XX
PR 18-DEC-1997; 97US-00993170.
PR 18-DEC-1997; 97US-00993722.
PR 18-DEC-1997; 97US-00993775.
PR 18-DEC-1997; 97US-00996441.
XX
PA (ECOG-) ECOGEN INC.

PA (MONS) MONSANTO CO.
 XX English L, Brussock SM, Malvar TM, Bryson JW, Kulesza CA;
 PI Walters FS, Slatin SL, Von Tersch MA, Romano C;
 DR WPI; 1999-395184/33.
 XX Insecticidal Bacillus thuringiensis proteins.
 PT Disclosure; Page 500-502; 512pp; English.
 XX
 XX The present sequence represents the Cry3Bb protein. The specification
 CC describes new Bacillus thuringiensis Cry3Bb mutant proteins, and provides
 CC methods for producing them. The B. thuringiensis Cry3Bb polypeptide was
 CC modified to have improved insecticidal activity or enhanced insecticidal
 CC specificity against a target insect. The modification comprises at least
 CC one amino acid substitution, addition, or deletion in the primary
 CC sequence of the native or unmodified Cry3Bb polypeptide, wherein the
 CC substitution or deletion occurs at a position corresponding to from about
 CC amino acids 1-365 of the unmodified polypeptide sequence (AA23207
 CC represents the wild type Cry3Bb protein). The polypeptide can be used to
 CC kill coleopteran pests, especially by application to the environment. It
 CC is especially useful against southern corn rootworm and western corn root
 CC worm, (Diabrotica undecimpunctata howardi Barber, and Diabrotica
 CC virgifera virgifera LeConte respectively). The mutant cry3Bb
 CC polynucleotides can also be used to produce transgenic plants with
 CC increased insecticide resistance
 XX
 SQ Sequence 652 AA;
 Query Match 100.0%; Score 3406; DB 2; Length 652;
 Best Local Similarity 100.0%; Pred. No. 7.4e-277;
 Matches 652; Conservative 0; Mismatches 0; Indels 0; Gaps 0;
 QY 1 MNPNNRSEHDTIKVTNPSELQTNHNOYPLADPNSTLEELNYKEFLRMTESSSTEVLDS 60
 DB 1 MNPNNRSEHDTIKVTNPSELQTNHNOYPLADPNSTLEELNYKEFLRMTESSSTEVLDS 60
 QY 61 TVKDAVGTGISVVGQILGVVGPFPAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120
 DB 61 TVKDAVGTGISVVGQILGVVGPFPAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120
 QY 121 KIEEYAKSKALAELOGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRSELFQAESHFN 180
 DB 121 KIEEYAKSKALAELOGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRSELFQAESHFN 180
 QY 181 SMPFAVSKFEVLFLPTTAAQAAANTHLLKDAQVGEWGYSSDVAEYFHRQLKLTQOY 240
 DB 181 SMPFAVSKFEVLFLPTTAAQAAANTHLLKDAQVGEWGYSSDVAEYFHRQLKLTQOY 240
 QY 241 TDHCNVNWNVGLNGLRGSTYDAWKFNRRREMTLTVLDLIVLPFYDIRLYSKGVKTEL 300
 DB 241 TDHCNVNWNVGLNGLRGSTYDAWKFNRRREMTLTVLDLIVLPFYDIRLYSKGVKTEL 300
 QY 301 TRDIFDTPISLNTLOEYGTFTLSIENSIRKPHLFDYLOQIEPHTRLOPGYFGKDSFNW 360
 DB 301 TRDIFDTPISLNTLOEYGTFTLSIENSIRKPHLFDYLOQIEPHTRLOPGYFGKDSFNW 360
 QY 361 SGNVETRPISGSKTITSPFYGDKSTPEVQKLSFDGQKYRTIANTDVAAMPNGKVYLG 420
 DB 361 SGNVETRPISGSKTITSPFYGDKSTPEVQKLSFDGQKYRTIANTDVAAMPNGKVYLG 420
 QY 421 VTKVDSOYDQKNESTQYDSKRNGHVSADSI1DOLPETTDDPLEKAYSHQLNYAE 480
 DB 421 VTKVDSOYDQKNESTQYDSKRNGHVSADSI1DOLPETTDDPLEKAYSHQLNYAE 480
 QY 481 CFLMQDRRGITPFTTWRHVSDFNTIDAEKITQLPVKAYALSSGASIEGPGFTGML 540
 DB 481 CFLMQDRRGITPFTTWRHVSDFNTIDAEKITQLPVKAYALSSGASIEGPGFTGML 540
 QY 541 LFLKESNSIAKPKVLNSAALLQRYVRIRYASTTNLRLFVQNSNNDLVIYINKTMNK 600
 DB 541 LFLKESNSIAKPKVLNSAALLQRYVRIRYASTTNLRLFVQNSNNDLVIYINKTMNK 600

QY 601 DDDLTYYOTFDLATTNSNMFGSGDKNELIIQAESFVSNEKIYIDKIERIPVOL 652
 DB 601 DDDLTYYOTFDLATTNSNMFGSGDKNELIIQAESFVSNEKIYIDKIERIPVOL 652
 RESULT 4
 AAY70441
 ID AAY70441 standard; protein; 652 AA.
 XX
 AC AAY70441;
 XX
 DT 21-JUN-2000 (first entry)
 XX
 DE Bacillus thuringiensis delta-endotoxin, Cry3Bb1.
 XX
 DE delta-endotoxin; Cry3B; Cry3Bb1; Bt toxin; crystal protein; insect pest;
 XX insecticide; Coleopteran; expression cassette; transgenic plant.
 KW
 XX Bacillus thuringiensis.
 OS
 XX WO200011185-A2.
 PN
 XX 02-MAR-2000.
 PD
 XX 19-AUG-1999; 99WO-US018883.
 PF
 XX 19-AUG-1998; 98US-0097150P.
 PR
 XX (MONS) MONSANTO CO.
 PA
 XX Romano CP;
 PI
 XX WPI: 2000-246568/21.
 DR
 XX N-PSDB; AA251635.
 DR
 XX Novel expression cassettes which express Bacillus thuringiensis Cry3
 PT delta-endotoxin portion which is toxic to coleopteran insect pests,
 PT useful for producing transgenic plants with improved insecticidal
 PT activity.
 XX
 PS Claim 5; Page 92-94; 171pp; English.
 XX
 CC The present sequence is a Bacillus thuringiensis delta-endotoxin, Cry3Bb1
 CC which is toxic to Coleopteran insect pests. The coding sequence of this
 CC protein is used in an expression cassette which provides improved
 CC expression of Cry3B or Cry3B variant proteins in transgenic plants e.g.
 CC maize. Transgenic plants expressing higher levels of Cry3B proteins
 CC exhibit increased insecticidal activity against Coleopteran pests
 XX
 SQ Sequence 652 AA;
 Query Match 100.0%; Score 3406; DB 3; Length 652;
 Best Local Similarity 100.0%; Pred. No. 7.4e-277;
 Matches 652; Conservative 0; Mismatches 0; Indels 0; Gaps 0;
 QY 1 MNPNNRSEHDTIKVTNPSELQTNHNOYPLADPNSTLEELNYKEFLRMTESSSTEVLDS 60
 DB 1 MNPNNRSEHDTIKVTNPSELQTNHNOYPLADPNSTLEELNYKEFLRMTESSSTEVLDS 60
 QY 61 TVKDAVGTGISVVGQILGVVGPFPAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120
 DB 61 TVKDAVGTGISVVGQILGVVGPFPAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120
 QY 121 KIEEYAKSKALAELOGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRSELFQAESHFN 180
 DB 121 KIEEYAKSKALAELOGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRSELFQAESHFN 180
 QY 181 SMPFAVSKFEVLFLPTTAAQAAANTHLLKDAQVGEWGYSSDVAEYFHRQLKLTQOY 240
 DB 181 SMPFAVSKFEVLFLPTTAAQAAANTHLLKDAQVGEWGYSSDVAEYFHRQLKLTQOY 240
 QY 241 TDHCNVNWNVGLNGLRGSTYDAWKFNRRREMTLTVLDLIVLPFYDIRLYSKGVKTEL 300

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Db 241 TDHCVNMYNGLNGLRGSTYDAWVKENFRREMTLTVDLILVLPFPFYDIRLYSGVKTEL 300
Qy 301 TRDIFTPIESLNTLOEYGTFLSIENSIRKPHLFDYLOGIEBHTRLQPGYFGKDSFNW 360
Db 301 TRDIFTPIESLNTLOEYGTFLSIENSIRKPHLFDYLOGIEBHTRLQPGYFGKDSFNW 360
Qy 361 SGNVETRPISGSSKITTSPPFYGDKSTPEVQKLSFDGQKVYRTIANTDVAWPNKGYLG 420
Db 361 SGNVETRPISGSSKITTSPPFYGDKSTPEVQKLSFDGQKVYRTIANTDVAWPNKGYLG 420
Qy 421 VTKVDFSQYDDQKNETSTQTYDSKRNGHVSQAODSIDQLPPTTDEPLEKAYSHQLNYAE 480
Db 421 VTKVDFSQYDDQKNETSTQTYDSKRNGHVSQAODSIDQLPPTTDEPLEKAYSHQLNYAE 480
Qy 481 CFLMQDRRGITPIFFTHTHRSVDFPNTIDAEKITQLPVVKAYALSSGASIIIEGPGTGGNL 540
Db 481 CFLMQDRRGITPIFFTHTHRSVDFPNTIDAEKITQLPVVKAYALSSGASIIIEGPGTGGNL 540
Qy 541 LFLKESNSIAKPKVTLSAALLQRYVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600
Db 541 LFLKESNSIAKPKVTLSAALLQRYVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600
Qy 601 DDLTYQTDFLATNNSMGFSGDKNELIIGAESFVSNKIIYIDKIEFIPVOL 652
Db 601 DDLTYQTDFLATNNSMGFSGDKNELIIGAESFVSNKIIYIDKIEFIPVOL 652

RESULT 5
ABU09192
ID ABU09192 standard; protein; 652 AA.
XX AC ABU09192;
XX DT 12-JUN-2003 (first entry)
XX DE Bacillus thuringiensis delta endotoxin Cry3Bb1.
XX KW Cry3Bb1; delta-endotoxin; plant; transgenic; insecticide; crystal 3;
XX KW Cry3; Coleopteran insect infestation; increased toxicity;
XX KW season long protection; beetle.
XX OS Bacillus thuringiensis.
XX PN US6501009-B1.
XX PD 31-DEC-2002.
XX PF 19-AUG-1999; 99US-00377466.
XX PR 19-AUG-1999; 99US-00377466.
XX PA (MONS ) MONSANTO TECHNOLOGY LLC.
XX PI Romano CP;
XX PI PI
XX DR WPI; 2003-352192/33.
XX DR N-PSDB; ABX95179.
XX PT New modified polynucleotide useful for controlling Coleopteran insect
XX PT infestation in a field of crop plants encodes insecticidal crystal 3
XX PT Bacillus thuringiensis delta-endotoxin.
XX PS Disclosure; Col 49-54; 107pp; English.
XX CC The invention relates to a modified polynucleotide which encodes an
XX CC insecticidal crystal 3 (Cry3) Bacillus thuringiensis delta-endotoxin such
XX CC as CryBb. The modified polynucleotide is useful for producing a
XX CC transformed cell, by introducing the modified polynucleotide into a cell
XX CC such as a plant cell (preferably a maize cell) or a microbial cell. The
XX CC modified polynucleotide is useful for producing a transformed maize plant
XX CC by introducing the modified polynucleotide into a maize plant cell,
XX CC selecting a transformed maize plant cell and regenerating a maize plant

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CC from the transformed maize plant cell. A transgenic plant expressing the
CC modified polynucleotide is useful for controlling Coleopteran insect
CC infestation in a field of crop plants. The modified polynucleotide is
CC useful for producing transgenic plants expressing higher levels of the
CC insect controlling B. thuringiensis delta-endotoxin. The modified
CC polynucleotide provides up to 10 fold higher levels of insect controlling
CC delta-endotoxin relative to the highest levels obtained using prior
CC compositions. In particular, transgenic maize expressing higher levels of
CC the Cry3Bb protein designed to exhibit increased toxicity toward
CC Coleopteran pests deliver superior levels of insect protection and are
CC less likely to sponsor development of populations of target insects that
CC are resistant to the insecticidally active protein. Improved control of
CC susceptible target insect pests and season long protection from insect
CC pathogens is achieved using the modified polynucleotide. The modified
CC polynucleotide reduces the number of transgenic events that have to be
CC screened in order to identify one which contains beneficial levels of one
CC or more insect controlling compositions. The present sequence represents
CC the amino acid sequence of Bacillus thuringiensis delta endotoxin Cry3Bb1
XX
XX Sequence 652 AA;

```

```

Query Match 100.0%; Score 3406; DB 6; Length 652;
Best Local Similarity 100.0%; Pred. No. 7.4e-277;
Matches 652; Conservative 0; Mismatches 0; Indels 0; Gaps 0;

Qy 1 MNPNNRSEHDTIKVTPNSELOTNHNOYPLADNPSTLEELNYKEFLRMWTESSSTEVLDNS 60
Db 1 MNPNNRSEHDTIKVTPNSELOTNHNOYPLADNPSTLEELNYKEFLRMWTESSSTEVLDNS 60

Qy 61 TVKDAVGTGISVVQILGVVGVFPFAGALTSTFYQSPLNTIWPSSDADPWKAPMAQVEVLIDK 120
Db 61 TVKDAVGTGISVVQILGVVGVFPFAGALTSTFYQSPLNTIWPSSDADPWKAPMAQVEVLIDK 120

Qy 121 KIEEYAKSKALAELOGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESFRN 180
Db 121 KIEEYAKSKALAELOGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESFRN 180

Qy 181 SNPSFAVSFKEVLFLPTYAQAANTHLLKDAQVGEWGYSEDVAEFVHRLKLTQQY 240
Db 181 SNPSFAVSFKEVLFLPTYAQAANTHLLKDAQVGEWGYSEDVAEFVHRLKLTQQY 240

Qy 241 THCVNMYNGLNGLRGSTYDAWVKENFRREMTLTVDLILVLPFPFYDIRLYSGVKTEL 300
Db 241 THCVNMYNGLNGLRGSTYDAWVKENFRREMTLTVDLILVLPFPFYDIRLYSGVKTEL 300

Qy 301 TRDIFTPIESLNTLOEYGTFLSIENSIRKPHLFDYLOGIEBHTRLQPGYFGKDSFNW 360
Db 301 TRDIFTPIESLNTLOEYGTFLSIENSIRKPHLFDYLOGIEBHTRLQPGYFGKDSFNW 360

Qy 361 SGNVETRPISGSSKITTSPPFYGDKSTPEVQKLSFDGQKVYRTIANTDVAWPNKGYLG 420
Db 361 SGNVETRPISGSSKITTSPPFYGDKSTPEVQKLSFDGQKVYRTIANTDVAWPNKGYLG 420

Qy 421 VTKVDFSQYDDQKNETSTQTYDSKRNGHVSQAODSIDQLPPTTDEPLEKAYSHQLNYAE 480
Db 421 VTKVDFSQYDDQKNETSTQTYDSKRNGHVSQAODSIDQLPPTTDEPLEKAYSHQLNYAE 480

Qy 481 CFLMQDRRGITPIFFTHTHRSVDFPNTIDAEKITQLPVVKAYALSSGASIIIEGPGTGGNL 540
Db 481 CFLMQDRRGITPIFFTHTHRSVDFPNTIDAEKITQLPVVKAYALSSGASIIIEGPGTGGNL 540

Qy 541 LFLKESNSIAKPKVTLSAALLQRYVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600
Db 541 LFLKESNSIAKPKVTLSAALLQRYVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600

Qy 601 DDLTYQTDFLATNNSMGFSGDKNELIIGAESFVSNKIIYIDKIEFIPVOL 652
Db 601 DDLTYQTDFLATNNSMGFSGDKNELIIGAESFVSNKIIYIDKIEFIPVOL 652

RESULT 6
ABW01050
ID ABW01050 standard; protein; 652 AA.

```


CC invention, and methods for their production, are useful for the
CC production of organisms with pesticide resistance, specifically bacteria
CC and plants. These organisms are useful for generating altered or improved
CC delta-endotoxin or delta-endotoxin-associated proteins that have
CC pesticidal activity, or for detecting the presence of delta-endotoxin or
CC delta-endotoxin-associated proteins or nucleic acids in products or
CC organisms.
XX
SQ Sequence 652 AA;

Query Match 100.0%; Score 3406; DB 8; Length 652;
Best Local Similarity 100.0%; Pred. No. 7.4e-276;
Matches 652; Conservative 0; Mismatches 0; Indels 0; Gaps 0;
QY 1 MNPNNRSEHDTIKVTNPSELQTNHNOYPLADNPNSTLEELNYKEFLRMTEDSDSTEVLNDS 60
DB 1 MNPNNRSEHDTIKVTNPSELQTNHNOYPLADNPNSTLEELNYKEFLRMTEDSDSTEVLNDS 60
QY 61 TVKDVGTSVVGQILGVVGVPPFAGALTSFYQSFLNTIWPSPADPWKAFMAQVEVLIDK 120
DB 61 TVKDVGTSVVGQILGVVGVPPFAGALTSFYQSFLNTIWPSPADPWKAFMAQVEVLIDK 120
QY 121 KIEEYAKSALAELOGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRLPSQASHFRN 180
DB 121 KIEEYAKSALAELOGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRLPSQASHFRN 180
QY 181 SMPFSAVSKPEVLFLPTYAQAANTHLLKDAQVFGEEGYSSEDAEFVHRLKLTQOY 240
DB 181 SMPFSAVSKPEVLFLPTYAQAANTHLLKDAQVFGEEGYSSEDAEFVHRLKLTQOY 240
QY 241 TDHCVMNMYNGLNGLRGSTYDAWKFNRRPREMTLVLDLIVLFPFDIRLSKGVKTEL 300
DB 241 TDHCVMNMYNGLNGLRGSTYDAWKFNRRPREMTLVLDLIVLFPFDIRLSKGVKTEL 300
QY 301 TRDIFTDPIFSLNTLOEYGTFLSIENSIRKPHLFDYLOGIEFHTRLQPGYFGKDSFNYW 360
DB 301 TRDIFTDPIFSLNTLOEYGTFLSIENSIRKPHLFDYLOGIEFHTRLQPGYFGKDSFNYW 360
QY 361 SGNVETRPISGSKTITSFYQDKSTEPVKLSFDGQKVYRTIANTDVAWPNKGKYLIG 420
DB 361 SGNVETRPISGSKTITSFYQDKSTEPVKLSFDGQKVYRTIANTDVAWPNKGKYLIG 420
QY 421 VTKVDFSQYDDQNETSTQYDSKRNNGHVSQAQDSIDQLPPTTDEPLEKAYSHQLNYAE 480
DB 421 VTKVDFSQYDDQNETSTQYDSKRNNGHVSQAQDSIDQLPPTTDEPLEKAYSHQLNYAE 480
QY 481 CFLMQDRRGTHPIPTWTHRSVDFPNTIDARKITQLPVKAYALSSGASIIIEGPGFTGGNL 540
DB 481 CFLMQDRRGTHPIPTWTHRSVDFPNTIDARKITQLPVKAYALSSGASIIIEGPGFTGGNL 540
QY 541 LFLKESNSIAKPKVTLNSAALLQRYVRIRYASTTNLRLVFQNSNNDPLVIVYINKTMNK 600
DB 541 LFLKESNSIAKPKVTLNSAALLQRYVRIRYASTTNLRLVFQNSNNDPLVIVYINKTMNK 600
QY 601 DDLTYQTFLATNSMGSGDKNELIIGAESFVSNKEIYIDKIEFIPVQL 652
DB 601 DDLTYQTFLATNSMGSGDKNELIIGAESFVSNKEIYIDKIEFIPVQL 652

RESULT 8
AAV23205
ID AAV23205 standard; protein; 652 AA.
XX
AC AAV23205;
XX
XX 24-AUG-1999 (first entry)
DT
DE Amino acid sequence of Cry3Bb.11095 polypeptide.
XX
KW Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
KW coleoptera; southern corn rootworm; western corn root worm;
KW Diabrotica undecimpunctata howardi Barber; transgenic plant;
KW Diabrotica virgifera verifera LeConte; insecticide resistance.

XX Synthetic.
OS Bacillus thuringiensis.
XX
PN WO9931248-A1.
XX
PD 24-JUN-1999.
XX
PF 17-DEC-1998; 98WO-US026852.
XX
PR 18-DEC-1997; 97US-00993170.
PR 18-DEC-1997; 97US-00993722.
PR 18-DEC-1997; 97US-00993775.
PR 18-DEC-1997; 97US-00996441.
XX
XX (ECOG-) ECOGEN INC.
PA (MONS) MONSANTO CO.
XX
PI English L, Brussock SM, Malvar TM, Bryson JW, Kulesza CA;
PI Walters FS, Slatin SL, Von Tersch MA, Romano C;
XX WPI; 1999-395184/33.
XX
XX Insecticidal Bacillus thuringiensis proteins.
PT
PS Claim 39; Page 457-460; 512pp; English.
XX
XX AAY23172-Y23206, and AAY23208-Y23209 represent new Bacillus thuringiensis
CC Cry3Bb mutant proteins. The specification also describes methods of
CC altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
CC polypeptide was modified to have improved insecticidal activity or
CC enhanced insecticidal specificity against a target insect. The
CC modification comprises at least one amino acid substitution, addition, or
CC deletion in the primary sequence of the native or unmodified Cry3Bb
CC polypeptide, wherein the substitution or deletion occurs at a position
CC corresponding to from about amino acids 1-365 of the unmodified
CC polypeptide sequence (AAY23207 represents the wild type Cry3Bb protein).
CC The polypeptide can be used to kill coleopteran pests, especially by
CC application to the environment. It is especially useful against southern
CC corn rootworm and western corn root worm, (Diabrotica undecimpunctata
CC howardi Barber, and Diabrotica virgifera verifera LeConte respectively).
CC The mutant cry3Bb polynucleotides can also be used to produce transgenic
CC plants with increased insecticide resistance
XX
SQ Sequence 652 AA;

Query Match 99.9%; Score 3402; DB 2; Length 652;
Best Local Similarity 99.8%; Pred. No. 1.6e-276;
Matches 651; Conservative 1; Mismatches 0; Indels 0; Gaps 0;
QY 1 MNPNNRSEHDTIKVTNPSELQTNHNOYPLADNPNSTLEELNYKEFLRMTEDSDSTEVLNDS 60
DB 1 MNPNNRSEHDTIKVTNPSELQTNHNOYPLADNPNSTLEELNYKEFLRMTEDSDSTEVLNDS 60
QY 61 TVKDVGTSVVGQILGVVGVPPFAGALTSFYQSFLNTIWPSPADPWKAFMAQVEVLIDK 120
DB 61 TVKDVGTSVVGQILGVVGVPPFAGALTSFYQSFLNTIWPSPADPWKAFMAQVEVLIDK 120
QY 121 KIEEYAKSALAELOGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRLPSQASHFRN 180
DB 121 KIEEYAKSALAELOGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRLPSQASHFRN 180
QY 181 SMPFSAVSKPEVLFLPTYAQAANTHLLKDAQVFGEEGYSSEDAEFVHRLKLTQOY 240
DB 181 SMPFSAVSKPEVLFLPTYAQAANTHLLKDAQVFGEEGYSSEDAEFVHRLKLTQOY 240
QY 241 TDHCVMNMYNGLNGLRGSTYDAWKFNRRPREMTLVLDLIVLFPFDIRLSKGVKTEL 300
DB 241 TDHCVMNMYNGLNGLRGSTYDAWKFNRRPREMTLVLDLIVLFPFDIRLSKGVKTEL 300
QY 301 TRDIFTDPIFSLNTLOEYGTFLSIENSIRKPHLFDYLOGIEFHTRLQPGYFGKDSFNYW 360
DB 301 TRDIFTDPIFSLNTLOEYGTFLSIENSIRKPHLFDYLOGIEFHTRLQPGYFGKDSFNYW 360

CC The polypeptide can be used to kill coleopteran pests, especially by
CC application to the environment. It is especially useful against southern
CC corn rootworm and western corn root worm, (Diabrotica undecimpunctata
CC howardi Barber, and Diabrotica virgifera vergifera LeConte respectively).
CC The mutant cry3Bb polynucleotides can also be used to produce transgenic
CC plants with increased insecticide resistance

XX Sequence 652 AA;

Query Match 99.9%; Score 3401; DB 2; Length 652;
Best Local Similarity 99.8%; Pred. No. 1.9e-276;
Matches 651; Conservative 0; Mismatches 1; Indels 0; Gaps 0;

QY 1 MNPNNRSEHDTIKVTNPSELQTNHNOYPLADNPNSLTLEELNYKEFLRMTEDSDSTEVLDNS 60
DB 1 MNPNNRSEHDTIKVTNPSELQTNHNOYPLADNPNSLTLEELNYKEFLRMTEDSDSTEVLDNS 60
QY 61 TVKDAVGTGISVVGQILGVVGPFPAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120
DB 61 TVKDAVGTGISVVGQILGVVGPFPAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120
QY 121 KIEEYAKSKALAELOGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRLELFSQAESHFRN 180
DB 121 KIEEYAKSKALAELOGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRLELFSQAESHFRN 180
QY 181 SMPFSAVSKPEVLFLPTYAQAANTHLLKDAQVFGEEWGYSSSDVAEFVHRQKLTKQY 240
DB 181 SMPFSAVSKPEVLFLPTYAQAANTHLLKDAQVFGEEWGYSSSDVAEFVHRQKLTKQY 240
QY 241 TDHCNVNWNVGLNGLRGSTDYDAWKFNFRREMTLTVLDLVLFPFYDRLYSKGVKTEL 300
DB 241 TDHCNVNWNVGLNGLRGSTDYDAWKFNFRREMTLTVLDLVLFPFYDRLYSKGVKTEL 300
QY 301 TRDITFDPIFSNLTLQEGPTFLSIENSIRKPHLFDYLQGLIEFFTRLQPGYFGKDSFNW 360
DB 301 TRDITFDPIFSNLTLQEGPTFLSIENSIRKPHLFDYLQGLIEFFTRLQPGYFGKDSFNW 360
QY 361 SGNVYETRPSIGSSKTIITSPFYGDKSTPEVKLSFDGQKVRTTANTDVAAMPNGKVYLG 420
DB 361 SGNVYETRPSIGSSKTIITSPFYGDKSTPEVKLSFDGQKVRTTANTDVAAMPNGKVYLG 420
QY 421 VTKVDFSQYDDOKNETSTQTYDSKNNGHVSAQDSIDQLPETTDEPLEKAYSHQLNAYE 480
DB 421 VTKVDFSQYDDOKNETSTQTYDSKNNGHVSAQDSIDQLPETTDEPLEKAYSHQLNAYE 480
QY 481 CFLMDRRGTIPFTWTHRSVDFNTIDAETITQLPVVKAYALSSGASIIIEGPGFTGNL 540
DB 481 CFLMDRRGTIPFTWTHRSVDFNTIDAETITQLPVVKAYALSSGASIIIEGPGFTGNL 540
QY 541 LFLKSSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDPLVIYINKTMWK 600
DB 541 LFLKSSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDPLVIYINKTMWK 600
QY 601 DDDLTYQTFLDATTNSNMFGSGDKNELIIGAESFVSNKIIYDKIEFIPVQL 652
DB 601 DDDLTYQTFLDATTNSNMFGSGDKNELIIGAESFVSNKIIYDKIEFIPVQL 652

RESULT 10

AAAY70443
ID AAY70443 standard; protein; 652 AA.

XX AC AAY70443;

XX DT 21-JUN-2000 (first entry)

XX DE Synthetic delta-endotoxin, Cry3Bb.

XX KW delta-endotoxin; Cry3B; Cry3Bb; Bt toxin; crystal protein; insect pest;
XX KW insecticide; Coleopteran; expression cassette; transgenic plant.

XX OS Synthetic.

OS Bacillus thuringiensis.

QY 361 SGNVYETRPSIGSSKTIITSPFYGDKSTPEVKLSFDGQKVRTTANTDVAAMPNGKVYLG 420
DB 361 SGNVYETRPSIGSSKTIITSPFYGDKSTPEVKLSFDGQKVRTTANTDVAAMPNGKVYLG 420
QY 421 VTKVDFSQYDDOKNETSTQTYDSKNNGHVSAQDSIDQLPETTDEPLEKAYSHQLNAYE 480
DB 421 VTKVDFSQYDDOKNETSTQTYDSKNNGHVSAQDSIDQLPETTDEPLEKAYSHQLNAYE 480
QY 481 CFLMDRRGTIPFTWTHRSVDFNTIDAETITQLPVVKAYALSSGASIIIEGPGFTGNL 540
DB 481 CFLMDRRGTIPFTWTHRSVDFNTIDAETITQLPVVKAYALSSGASIIIEGPGFTGNL 540
QY 541 LFLKSSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDPLVIYINKTMWK 600
DB 541 LFLKSSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDPLVIYINKTMWK 600
QY 601 DDDLTYQTFLDATTNSNMFGSGDKNELIIGAESFVSNKIIYDKIEFIPVQL 652
DB 601 DDDLTYQTFLDATTNSNMFGSGDKNELIIGAESFVSNKIIYDKIEFIPVQL 652

RESULT 9
AAAY23178

ID AAY23178 standard; protein; 652 AA.

XX AC AAY23178;

XX DT 24-AUG-1999 (first entry)

XX DE Amino acid sequence of Cry3Bb.11227 polypeptide.

XX KW Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
XX KW coleoptera; southern corn rootworm; western corn root worm;
XX KW Diabrotica undecimpunctata howardi Barber; transgenic plant;
XX KW Diabrotica virgifera vergifera LeConte; insecticide resistance.

XX OS Synthetic.
XX OS Bacillus thuringiensis.

XX PN WO9931248-A1.

XX PD 24-JUN-1999.

XX PF 17-DEC-1998; 98WO-US026852.

XX PR 18-DEC-1997; 97US-009933170.

XX PR 18-DEC-1997; 97US-009933722.

XX PR 18-DEC-1997; 97US-009933775.

XX PR 18-DEC-1997; 97US-00996441.

XX PA (ECOG-) ECOGEN INC.

XX PA (MONS) MONSANTO CO.

XX PI English L, Brussock SM, Malvar TM, Bryson JW, Kulesza C;

XX PI Walters FS, Slatin SL, Von Tersch MA, Romano C;

XX WPI; 1999-395184/33.

XX DE Insecticidal Bacillus thuringiensis proteins.

XX FS Claim 39; Page 306-308; 512pp; English.

XX CC AAY23172-Y23206, and AAY23208-X23209 represent new Bacillus thuringiensis
XX CC Cry3Bb mutant proteins. The specification also describes methods of
XX CC altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
XX CC polypeptide was modified to have improved insecticidal activity or
XX CC enhanced insecticidal specificity against a target insect. The
XX CC modification comprises at least one amino acid substitution, addition, or
XX CC deletion in the primary sequence of the native or unmodified Cry3Bb
XX CC polypeptide, wherein the substitution or deletion occurs at a position
XX CC corresponding to from amino acids 1-365 of the unmodified
XX CC polypeptide sequence (AAY23207 represents the wild type Cry3Bb protein).


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AAV23195
ID AAV23195 standard; protein; 652 AA.
XX
AC AAV23195;
XX
DT 24-AUG-1999 (first entry)
XX
DE Amino acid sequence of Cry3Bb.11036 polypeptide.
XX
KW Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
KW coleoptera; southern corn rootworm; western corn root worm;
KW Diabrotica undecimpunctata howardi Barber; transgenic plant;
KW Diabrotica virgifera vergifera LeConte; insecticide resistance.
XX
OS Synthetic.
OS Bacillus thuringiensis.
XX
PN W09931248-A1.
XX
PD 24-JUN-1999.
XX
PF 17-DEC-1998; 98WO-US026852.
XX
PR 18-DEC-1997; 97US-00993170.
PR 18-DEC-1997; 97US-00993722.
PR 18-DEC-1997; 97US-00993775.
PR 18-DEC-1997; 97US-00996441.
XX
PA (ECOG-) ECOGEN INC.
PA (MONS ) MONSANTO CO.
XX
PI English L, Brussock SM, Malvar TM, Bryson JW, Kulesza CA;
PI Walters FS, Slatin SL, von Tersch MA, Romano C;
XX
DR WPI; 1999-395184/33.
XX
PT Insecticidal Bacillus thuringiensis proteins.

Claim 39; Page 401-403; 512pp; English.

AAV23172-Y23206, and AAV23208-X33209 represent new Bacillus thuringiensis
Cry3Bb mutant proteins. The specification also describes methods of
altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
polypeptide was modified to have improved insecticidal activity or
enhanced insecticidal specificity against a target insect. The
modification comprises at least one amino acid substitution, addition, or
deletion in the primary sequence of the native or unmodified Cry3Bb
polypeptide, wherein the substitution or deletion occurs at a position
corresponding to from about amino acids 1-365 of the unmodified
polypeptide sequence (AAV23207 represents the wild type Cry3Bb protein).
The polypeptide can be used to kill coleopteran pests, especially by
application to the environment. It is especially useful against southern
corn rootworm and western corn root worm, (Diabrotica undecimpunctata
howardi Barber, and Diabrotica virgifera vergifera LeConte respectively).
The mutant cry3Bb polynucleotides can also be used to produce transgenic
plants with increased insecticide resistance

XX Sequence 652 AA;

Query Match 99.8%; Score 3400; DB 2; Length 652;
Best Local Similarity 99.7%; Pred. No. 2.4e-276;
Matches 650; Conservative 1; Mismatches 1; Indels 0; Gaps 0;

QY 1 MNPNNRSEHDTIKVTNPSELQTHNQYPLADNPNSTLEELNYKEFLMTEDSDSTEVLNDS 60
DB 1 MNPNNRSEHDTIKVTNPSELQTHNQYPLADNPNSTLEELNYKEFLMTEDSDSTEVLNDS 60
QY 61 TVKDVGTSISVVGQILGVGVPPFAGALTSFYQSFLNTIWPSPADPKAFMAQVEVLIDK 120
DB 61 TVKDVGTSISVVGQILGVGVPPFAGALTSFYQSFLNTIWPSPADPKAFMAQVEVLIDK 120
QY 121 KIEEYAKSALAELOGLQNNFEDYVNALNSWKKTPLSLRSKRSDRIRLFSQAESHFRN 180
DB 121 KIEEYAKSALAELOGLQNNFEDYVNALNSWKKTPLSLRSKRSDRIRLFSQAESHFRN 180

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XX Claim 39; Page 356-358; 512pp; English.

XX AAY23172-Y23206, and AAY23208-X23209 represent new *Bacillus thuringiensis*

CC Cry3Bb mutant proteins. The specification also describes methods of

CC altering *Bacillus thuringiensis* Cry3Bb. The *B. thuringiensis* Cry3Bb

CC polypeptide was modified to have improved insecticidal activity or

CC enhanced insecticidal specificity against a target insect. The

CC modification comprises at least one amino acid substitution, addition, or

CC deletion in the primary sequence of the native or unmodified Cry3Bb

CC polypeptide, wherein the substitution or deletion occurs at a position

CC corresponding to from about amino acids 1-365 of the unmodified

CC polypeptide sequence (AAY23207 represents the wild type Cry3Bb protein).

CC The polypeptide can be used to kill coleopteran pests, especially by

CC application to the environment. It is especially useful against southern

CC corn rootworm and western corn root worm, (*Diabrotica undecimpunctata*

CC howardi Barber, and *Diabrotica virgifera virgifera* LeConte respectively).

CC The mutant cry3Bb polynucleotides can also be used to produce transgenic

CC plants with increased insecticide resistance

XX Sequence 652 AA;

Query Match 99.8%; Score 3400; DB 2; Length 652;

Best Local Similarity 99.8%; Pred. No. 2.4e-276;

Matches 651; Conservative 0; Mismatches 1; Indels 0; Gaps 0;

QY 1 MNPNNRSEHDTTKVTPNSELOTHNQYPLADNPSTLEELNYKEFLRMTEDSSTVELDNS 60

DB 1 MNPNNRSEHDTTKVTPNSELOTHNQYPLADNPSTLEELNYKEFLRMTEDSSTVELDNS 60

QY 61 TVKDAVGTVGIVGVGQILGVGVFPFAGALTSFYQSFINTIWPSDADPWKAFMAQVEVLIDK 120

DB 61 TVKDAVGTVGIVGVGQILGVGVFPFAGALTSFYQSFINTIWPSDADPWKAFMAQVEVLIDK 120

QY 121 KIEEYAKSKALAELOGLQNNFEDYVNALNSWKTKTFLSLRSKRSQDRIRFLFSQAESHFN 180

DB 121 KIEEYAKSKALAELOGLQNNFEDYVNALNSWKTKTFLSLRSKRSQDRIRFLFSQAESHFN 180

QY 181 SMPFAVSKFEVLFTPTAAQANTHLLLDKQAVGEEGYSSDVAEYHRLKLTQY 240

DB 181 SMPFAVSKFEVLFTPTAAQANTHLLLDKQAVGEEGYSSDVAEYHRLKLTQY 240

QY 241 TDHCNVNNGVGLRGSTYDAWVFNRRRMTLTVLDLIVFFYDRLYKSGVKTEL 300

DB 241 TDHCNVNNGVGLRGSTYDAWVFNRRRMTLTVLDLIVFFYDRLYKSGVKTEL 300

QY 301 TRDIETDPIFSLNTLQYGTFLSIENSIRKPHLFDYLGQIEFHTRLQPGYFGKDSFNW 360

DB 301 TRDIETDPIFSLNTLQYGTFLSIENSIRKPHLFDYLGQIEFHTRLQPGYFGKDSFNW 360

QY 361 SGNYVETRPSIGSKTITSPPFGDKSTEPVKLSFDGQKVYRTIANTDVAAMPNGKVYL 420

DB 361 SGNYVETRPSIGSKTITSPPFGDKSTEPVKLSFDGQKVYRTIANTDVAAMPNGKVYL 420

QY 421 VTKVDFQSDQKNETSTQYDSKRNGHVSAQDSIDQLPPTTDEPLEKAYSHOLNVAE 480

DB 421 VTKVDFQSDQKNETSTQYDSKRNGHVSAQDSIDQLPPTTDEPLEKAYSHOLNVAE 480

QY 481 CFLMDRRGTIPFFTWTHRSVDFNNTIDAEKITQLPVPVKAYALSSGASIEGFGTGGNL 540

DB 481 CFLMDRRGTIPFFTWTHRSVDFNNTIDAEKITQLPVPVKAYALSSGASIEGFGTGGNL 540

QY 541 LFLKSSNSIAKFKVTLSAALLQRYVRIRVASTTNLRLFVQNSNNDPLVYIYINKTNK 600

DB 541 LFLKSSNSIAKFKVTLSAALLQRYVRIRVASTTNLRLFVQNSNNDPLVYIYINKTNK 600

QY 601 DDDLTQTQFDLATTNSMGFGSKNELIIGAESFVSNKEIYIDKTEFIPVQL 652

DB 601 DDDLTQTQFDLATTNSMGFGSGDKNELIIGAESFVSNKEIYIDKTEFIPVQL 652

ID AAY23193 standard; protein; 652 AA.

XX AAY23193;

AC AAY23193;

XX 24-AUG-1999 (first entry)

DT Amino acid sequence of Cry3Bb.11032 polypeptide.

DE Cry3Bb; mutant; insecticidal activity; insecticidal specificity;

XX coleoptera; southern corn rootworm; western corn root worm;

KW *Diabrotica undecimpunctata* howardi Barber; transgenic plant;

KW *Diabrotica virgifera virgifera* LeConte; insecticide resistance.

XX Synthetic.

OS *Bacillus thuringiensis*.

XX WO9931248-A1.

PN 24-JUN-1999.

XX 17-DEC-1998; 98WO-US026852.

PF 18-DEC-1997; 97US-00993170.

PR 18-DEC-1997; 97US-00993722.

PR 18-DEC-1997; 97US-00993775.

PR 18-DEC-1997; 97US-00996441.

XX (ECOG-) ECOGEN INC.

PA (MONS) MONSANTO CO.

XX English L, Brussock SM, Malvar TM, Bryson JW, Kulesza CA;

PI Walters PS, Slatin SL, Von Tersch MA, Romano C;

XX WPI; 1999-395184/33.

DR Insecticidal *Bacillus thuringiensis* proteins.

PT Claim 39; Page 390-392; 512pp; English.

PS AAY23172-Y23206, and AAY23208-X23209 represent new *Bacillus thuringiensis*

CC Cry3Bb mutant proteins. The specification also describes methods of

CC altering *Bacillus thuringiensis* Cry3Bb. The *B. thuringiensis* Cry3Bb

CC polypeptide was modified to have improved insecticidal activity or

CC enhanced insecticidal specificity against a target insect. The

CC modification comprises at least one amino acid substitution, addition, or

CC deletion in the primary sequence of the native or unmodified Cry3Bb

CC polypeptide, wherein the substitution or deletion occurs at a position

CC corresponding to from about amino acids 1-365 of the unmodified

CC polypeptide sequence (AAY23207 represents the wild type Cry3Bb protein).

CC The polypeptide can be used to kill coleopteran pests, especially by

CC application to the environment. It is especially useful against southern

CC corn rootworm and western corn root worm, (*Diabrotica undecimpunctata*

CC howardi Barber, and *Diabrotica virgifera virgifera* LeConte respectively).

CC The mutant cry3Bb polynucleotides can also be used to produce transgenic

CC plants with increased insecticide resistance

XX Sequence 652 AA;

Query Match 99.8%; Score 3399; DB 2; Length 652;

Best Local Similarity 99.8%; Pred. No. 2.9e-276;

Matches 651; Conservative 0; Mismatches 1; Indels 0; Gaps 0;

QY 1 MNPNNRSEHDTTKVTPNSELOTHNQYPLADNPSTLEELNYKEFLRMTEDSSTVELDNS 60

DB 1 MNPNNRSEHDTTKVTPNSELOTHNQYPLADNPSTLEELNYKEFLRMTEDSSTVELDNS 60

QY 61 TVKDAVGTVGIVGVGQILGVGVFPFAGALTSFYQSFINTIWPSDADPWKAFMAQVEVLIDK 120

DB 61 TVKDAVGTVGIVGVGQILGVGVFPFAGALTSFYQSFINTIWPSDADPWKAFMAQVEVLIDK 120

QY 121 KIEEYAKSKALAELOGLQNNFEDYVNALNSWKTKTFLSLRSKRSQDRIRFLFSQAESHFN 180

DB 121 KIEEYAKSKALAELOGLQNNFEDYVNALNSWKTKTFLSLRSKRSQDRIRFLFSQAESHFN 180

181 SMPFAVSKEFVFLPTTAAQANTHLLLLKDAQVFGGEWGYSSDVAEFYHROLKLTQQY 240
181 SMPFAVSKEFVFLPTTAAQANTHLLLLKDAQVFGGEWGYSSDVAEFYHROLKLTQQY 240
241 TDHCVNMYNGLNGRSTYDAWVKFNRRPREMTLTVDLIVLPFFYDIRLYSGVKTEL 300
241 TDHCVNMYNGLNGRSTYDAWVKFNRRPREMTLTVDLIVLPFFYDIRLYSGVKTEL 300
301 TRDIFTDPIFSLNTLQEGYPTFLSIENSIKPHLFDYLOGIEFHTRLQPGYFGKDSFNW 360
301 TRDIFTDPIFSLNTLQEGYPTFLSIENSIKPHLFDYLOGIEFHTRLQPGYFGKDSFNW 360
361 SGNVETRPSIGSSKTIITSPFYGDKSTPEPVQKLSFDGQKVYRTIANTDVAWPNKGKYL 420
361 SGNVETRPSIGSSKTIITSPFYGDKSTPEPVQKLSFDGQKVYRTIANTDVAWPNKGKYL 420
421 VTKVDFSYDDQKNETSTQYDSKRNNHVSQAQDSIDQLPPETDPEKAYSHQLNYAE 480
421 VTKVDFSYDDQKNETSTQYDSKRNNHVSQAQDSIDQLPPETDPEKAYSHQLNYAE 480
481 CFLMODRRGTIPPTTWTTHRSVDFNTIDAEKITQLPVVKAYALSSGASIIIEGPGFTGGNL 540
481 CFLMODRRGTIPPTTWTTHRSVDFNTIDAEKITQLPVVKAYALSSGASIIIEGPGFTGGNL 540
541 LFLKSSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIVINKTMNK 600
541 LFLKSSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIVINKTMNK 600
601 DDLTYQTFTDLATNSNMFGSGDKNELIIIGAESFVSNKEIYIDKIEFIPVOL 652
601 DDLTYQTFTDLATNSNMFGSGDKNELIIIGAESFVSNKEIYIDKIEFIPVOL 652

RESULT 16

AA23175
ID AAY23198 standard; protein; 652 AA.

AC AAY23198;

DT 24-AUG-1999 (first entry)

DE Amino acid sequence of Cry3Bb.11051 polypeptide.

XX Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
KW coleoptera; southern corn rootworm; western corn root worm;
KW Diabrotica undecimpunctata howardi Barber; transgenic plant;
XX Diabrotica virgifera verifera LeConte; insecticide resistance.

OS Synthetic.
OS Bacillus thuringiensis.

XX WO9931248-A1.

XX 24-JUN-1999.

XX 17-DEC-1998; 98WO-US026852.

XX 18-DEC-1997; 97US-00993170.

PR 18-DEC-1997; 97US-00993722.

PR 18-DEC-1997; 97US-00993775.

PR 18-DEC-1997; 97US-00996441.

XX (ECOG-) ECOGEN INC.

PA (MONS) MONSANTO CO.

XX English L, Brusseck SM, Malvar TM, Bryson JW, Kulesza CA;

PI Walters FS, Slatin SL, Von Tersch MA, Romano C;

XX WPI; 1999-395184/33.

XX Insecticidal Bacillus thuringiensis proteins.

PS Claim 39; Page 418-420; 512pp; English.

XX AAY23172-Y23206, and AAY23208-X23209 represent new Bacillus thuringiensis
CC Cry3Bb mutant proteins. The specification also describes methods of
CC altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
CC polypeptide was modified to have improved insecticidal activity or
CC enhanced insecticidal specificity against a target insect. The
CC modification comprises at least one amino acid substitution, addition, or
CC deletion in the primary sequence of the native or unmodified Cry3Bb
CC polypeptide, wherein the substitution or deletion occurs at a position
CC corresponding to from about amino acids 1-365 of the unmodified
CC polypeptide sequence (AAY23207 represents the wild type Cry3Bb protein).
CC The polypeptide can be used to kill coleopteran pests, especially by
CC application to the environment. It is especially useful against southern
CC corn rootworm and western corn root worm. (Diabrotica undecimpunctata
CC howardi Barber, and Diabrotica virgifera verifera LeConte respectively).
CC The mutant cry3Bb polynucleotides can also be used to produce transgenic
CC plants with increased insecticide resistance
XX
SQ Sequence 652 AA;

Query Match 99.8%; Score 3399; DB 2; Length 652;

Best Local Similarity 99.8%; Pred. No. 2.9e-276;

Matches 651; Conservative 0; Mismatches 1; Indels 0; Gaps 0;

QY 1 MNPNNRSEHDTIKVTNSELQTNHNOYPLADNPNSTLEELNYKEFLRMTEDSDSTEVLDNS 60

DB 1 MNPNNRSEHDTIKVTNSELQTNHNOYPLADNPNSTLEELNYKEFLRMTEDSDSTEVLDNS 60

QY 61 TVKDAVGTGIVVGVQILGVVGVFPAGALTSTFYQSLNTIWPSSDADPWKAFMAQVEVLIDK 120

DB 61 TVKDAVGTGIVVGVQILGVVGVFPAGALTSTFYQSLNTIWPSSDADPWKAFMAQVEVLIDK 120

QY 121 KIEEYAKSKALAELOGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFN 180

DB 121 KIEEYAKSKALAELOGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFN 180

QY 181 SMPFAVSKEFVFLPTTAAQANTHLLLLKDAQVFGGEWGYSSDVAEFYHROLKLTQQY 240

DB 181 SMPFAVSKEFVFLPTTAAQANTHLLLLKDAQVFGGEWGYSSDVAEFYHROLKLTQQY 240

QY 241 TDHCVNMYNGLNGRSTYDAWVKFNRRPREMTLTVDLIVLPFFYDIRLYSGVKTEL 300

DB 241 TDHCVNMYNGLNGRSTYDAWVKFNRRPREMTLTVDLIVLPFFYDIRLYSGVKTEL 300

QY 301 TRDIFTDPIFSLNTLQEGYPTFLSIENSIKPHLFDYLOGIEFHTRLQPGYFGKDSFNW 360

DB 301 TRDIFTDPIFSLNTLQEGYPTFLSIENSIKPHLFDYLOGIEFHTRLQPGYFGKDSFNW 360

QY 361 SGNVETRPSIGSSKTIITSPFYGDKSTPEPVQKLSFDGQKVYRTIANTDVAWPNKGKYL 420

DB 361 SGNVETRPSIGSSKTIITSPFYGDKSTPEPVQKLSFDGQKVYRTIANTDVAWPNKGKYL 420

QY 421 VTKVDFSYDDQKNETSTQYDSKRNNHVSQAQDSIDQLPPETDPEKAYSHQLNYAE 480

DB 421 VTKVDFSYDDQKNETSTQYDSKRNNHVSQAQDSIDQLPPETDPEKAYSHQLNYAE 480

QY 481 CFLMODRRGTIPPTTWTTHRSVDFNTIDAEKITQLPVVKAYALSSGASIIIEGPGFTGGNL 540

DB 481 CFLMODRRGTIPPTTWTTHRSVDFNTIDAEKITQLPVVKAYALSSGASIIIEGPGFTGGNL 540

QY 541 LFLKSSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIVINKTMNK 600

DB 541 LFLKSSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIVINKTMNK 600

QY 601 DDLTYQTFTDLATNSNMFGSGDKNELIIIGAESFVSNKEIYIDKIEFIPVOL 652

DB 601 DDLTYQTFTDLATNSNMFGSGDKNELIIIGAESFVSNKEIYIDKIEFIPVOL 652

RESULT 17

AA23175

ID AAY23175 standard; protein; 652 AA.

XX AAY231175;
AC 24-AUG-1999 (first entry)
DT Amino acid sequence of Cry3Bb.11224 polypeptide.
DE Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
KW coleoptera; southern corn rootworm; western corn root worm;
KW Diabrotica undecimpunctata howardi Barber; transgenic plant;
KW Diabrotica virgifera virgifera LeConte; insecticide resistance.
OS Synthetic.
OS Bacillus thuringiensis.
XX WO9931248-A1.
XX 24-JUN-1999.
XX 17-DEC-1998; 98WO-US026852.
XX 18-DEC-1997; 97US-009931170.
PR 18-DEC-1997; 97US-00993722.
PR 18-DEC-1997; 97US-00993775.
PR 18-DEC-1997; 97US-00996441.
XX (ECOG-) ECOGEN INC.
PA (MONS) MONSANTO CO.
PI English L, Brussock SM, Malvar TM, Bryson JW, Kulesza CA;
PI Walters FS, Slatin SL, Von Tersch MA, Romano C;
XX WPI; 1999-395184/33.
XX Insecticidal Bacillus thuringiensis proteins.
PS Claim 39; Page 289-291; 512pp; English.
XX AAY231172-Y23206, and AAY23208-X23209 represent new Bacillus thuringiensis
CC Cry3Bb mutant proteins. The specification also describes methods of
CC altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
CC polypeptide was modified to have improved insecticidal activity or
CC enhanced insecticidal specificity against a target insect. The
CC modification comprises at least one amino acid substitution, addition, or
CC deletion in the primary sequence of the native or unmodified Cry3Bb
CC polypeptide, wherein the substitution or deletion occurs at a position
CC corresponding to from about amino acids 1-365 of the unmodified
CC polypeptide sequence (AAY23207 represents the wild type Cry3Bb protein).
CC The polypeptide can be used to kill coleopteran pests, especially by
CC application to the environment. It is especially useful against southern
CC corn rootworm and western corn root worm, (Diabrotica undecimpunctata
CC howardi Barber, and Diabrotica virgifera virgifera LeConte respectively).
CC The mutant cry3Bb polynucleotides can also be used to produce transgenic
CC plants with increased insecticide resistance
XX Sequence 652 AA;
SQ

Query Match 99.8%; Score 3398; DB 2; Length 652;
Best Local Similarity 99.8%; Pred. NO. 3.5e-276;
Matches 651; Conservative 0; Mismatches 1; Indels 0; Gaps 0;
QY 1 MNPNNRSEHDTTKVTNSLQTNHNOYPLADNPNSLTLELNKKEFLRMTEDSSTEVLNDS 60
DB 1 MNPNNRSEHDTTKVTNSLQTNHNOYPLADNPNSLTLELNKKEFLRMTEDSSTEVLNDS 60
QY 61 TVKDAVGTGIVGVVQILGVVVPFAGALTSFYQSLNTIWPSDADPWKAFMAQVEVLIDK 120
DB 61 TVKDAVGTGIVGVVQILGVVVPFAGALTSFYQSLNTIWPSDADPWKAFMAQVEVLIDK 120
QY 121 KIEEYAKSKALAELOQLQNNFEDYNALNSWKKTPLSLRSKRSQDRIRFLFQAESHFN 180
DB 121 KIEEYAKSKALAELOQLQNNFEDYNALNSWKKTPLSLRSKRSQDRIRFLFQAESHFN 180

QY 181 SMPSFVSKFEVLFLPTTYAQAAANTHLLLLKDAQVFGBEWGYSSBDAEYFHRQLKLTOQY 240
DB 181 SMPSFVSKFEVLFLPTTYAQAAANTHLLLLKDAQVFGBEWGYSSBDAEYFHRQLKLTOQY 240
QY 241 TDHCVNWNVGLNGLRGSTDYDAWVKFNFRREMTLTVLDLIVLFPFYDIRLYSGVKTEL 300
DB 241 TDHCVNWNVGLNGLRGSTDYDAWVKFNFRREMTLTVLDLIVLFPFYDIRLYSGVKTEL 300
QY 301 TRDIFTDPIFSLNTLOEYGPFTFLSIENSIRKPHLFDYLOGIEFHTRLOPGYFGKDSFNW 360
DB 301 TRDIFTDPIFSLNTLOEYGPFTFLSIENSIRKPHLFDYLOGIEFHTRLOPGYFGKDSFNW 360
QY 361 SGNVETRPSIGSSKTTITSPFYGDKSTPEVKLSFDGQKVYRTIANTDVAAMPNGKVILG 420
DB 361 SGNVETRPSIGSSKTTITSPFYGDKSTPEVKLSFDGQKVYRTIANTDVAAMPNGKVILG 420
QY 421 VTKVDFSOYDDQKNETSTQTYDSKRNNHVSQAQSIDQLPPTTDEPLEKAYSHQLNTAE 480
DB 421 VTKVDFSOYDDQKNETSTQTYDSKRNNHVSQAQSIDQLPPTTDEPLEKAYSHQLNTAE 480
QY 481 CFLMQDRRGTTIPFFTWTHRSVDFFNTIDAETITOLPVVKAYALSSGASIIISGPGTGGNL 540
DB 481 CFLMQDRRGTTIPFFTWTHRSVDFFNTIDAETITOLPVVKAYALSSGASIIISGPGTGGNL 540
QY 541 LFLKSSNSIAKFKVTLNSAALLQRYRIRYASTTNLRLFVQNSNNDFLVIYINKTNWK 600
DB 541 LFLKSSNSIAKFKVTLNSAALLQRYRIRYASTTNLRLFVQNSNNDFLVIYINKTNWK 600
QY 601 DDDLTYYQTFDLATTNSNMGFSGDKNELIIGAESFVSNKEKIYIDKIEFIPVQL 652
DB 601 DDDLTYYQTFDLATTNSNMGFSGDKNELIIGAESFVSNKEKIYIDKIEFIPVQL 652

RESULT 18
AAY231184
ID AAY231184 standard; protein; 652 AA.
XX AC AAY231184;
XX 24-AUG-1999 (first entry)
XX Amino acid sequence of Cry3Bb.11233 polypeptide.
KW Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
KW coleoptera; southern corn rootworm; western corn root worm;
KW Diabrotica undecimpunctata howardi Barber; transgenic plant;
KW Diabrotica virgifera virgifera LeConte; insecticide resistance.
OS Synthetic.
OS Bacillus thuringiensis.
XX WO9931248-A1.
XX 24-JUN-1999.
XX 17-DEC-1998; 98WO-US026852.
XX 18-DEC-1997; 97US-009931170.
PR 18-DEC-1997; 97US-00993722.
PR 18-DEC-1997; 97US-00993775.
PR 18-DEC-1997; 97US-00996441.
XX (ECOG-) ECOGEN INC.
PA (MONS) MONSANTO CO.
XX English L, Brussock SM, Malvar TM, Bryson JW, Kulesza CA;
XX Walters FS, Slatin SL, Von Tersch MA, Romano C;
XX WPI; 1999-395184/33.
XX Insecticidal Bacillus thuringiensis proteins.
XX Claim 39; Page 339-342; 512pp; English.
PS

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XX AAY23172-Y23206, and AAX23208-X23209 represent new Bacillus thuringiensis
CC Cry3Bb mutant proteins. The specification also describes methods of
CC altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
CC polypeptide was modified to have improved insecticidal activity or
CC enhanced insecticidal specificity against a target insect. The
CC modification comprises at least one amino acid substitution, addition, or
CC deletion in the primary sequence of the native or unmodified Cry3Bb
CC polypeptide, wherein the substitution or deletion occurs at a position
CC corresponding to from about amino acids 1-365 of the unmodified
CC polypeptide sequence (AAY23207 represents the wild type Cry3Bb protein).
CC The polypeptide can be used to kill coleopteran pests, especially by
CC application to the environment. It is especially useful against southern
CC corn rootworm and western corn root worm, (Diabrotica undecimpunctata
CC howardi Barber, and Diabrotica virgifera LeConte respectively).
CC The mutant cry3Bb polynucleotides can also be used to produce transgenic
CC plants with increased insecticide resistance
XX
SQ Sequence 652 AA;
Query Match 99.8%; Score 3398; DB 2; Length 652;
Best Local Similarity 99.7%; Pred. No. 3.5e-276;
Matches 650; Conservative 1; Mismatches 1; Indels 0; Gaps 0;
QY 1 MNPNNRSEHDTIKVTPNSELQTNHNOYPLADNPNSTLEELNYKEFLRMTESSSTEVLNDS 60
DB 1 MNPNNRSEHDTIKVTPNSELQTNHNOYPLADNPNSTLEELNYKEFLRMTESSSTEVLNDS 60
QY 61 TVKDVGVTGISVVGQILGVGVFPFAGALTSFYQSFLNTIWPSPDADPWKAFMAQVEVLIDK 120
DB 61 TVKDVGVTGISVVGQILGVGVFPFAGALTSFYQSFLNTIWPSPDADPWKAFMAQVEVLIDK 120
QY 121 KIEEYAKSKALAELOGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRLFSQAESHFRN 180
DB 121 KIEEYAKSKALAELOGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRLFSQAESHFRN 180
QY 181 SMPFSAVSKFEVLFLPTAAQANTHLLLLKDAQVFGEEGYSSSEDVAEFYHRQLKLTQOY 240
DB 181 SMPFSAVSKFEVLFLPTAAQANTHLLLLKDAQVFGEEGYSSSEDVAEFYHRQLKLTQOY 240
QY 241 TDHCVNWNVGNLGRSTYDAWKNRFRREMTLVLDLIVLPFYDIRLYSGVKYTEL 300
DB 241 TDHCVNWNVGNLGRSTYDAWKNRFRREMTLVLDLIVLPFYDIRLYSGVKYTEL 300
QY 301 TRDIFTDPIFSLNTLOEYGTPLS IENSIRKPHLFDYLOGIEPHTRLQPCYFGKDSFNW 360
DB 301 TRDIFTDPIFSLNTLOEYGTPLS IENSIRKPHLFDYLOGIEPHTRLQPCYFGKDSFNW 360
QY 361 SGNVYETRPSIGSKTITSPFYGDKSTEPVQKLSFDGQKYRTIANTDVAAMPNGKVIYLG 420
DB 361 SGNVYETRPSIGSKTITSPFYGDKSTEPVQKLSFDGQKYRTIANTDVAAMPNGKVIYLG 420
QY 421 VTKVDFSOYDDQKNSTSTQYDSKRNNGHVSAQDSIDQLPPETDPLEKAYSHQLNYAE 480
DB 421 VTKVDFSOYDDQKNSTSTQYDSKRNNGHVSAQDSIDQLPPETDPLEKAYSHQLNYAE 480
QY 481 CFLMQDRRGTPFTFTHRSVDNFNTIDAEKITQLPVKAYALSSGASIIIEGPGFTGGNL 540
DB 481 CFLMQDRRGTPFTFTHRSVDNFNTIDAEKITQLPVKAYALSSGASIIIEGPGFTGGNL 540
QY 541 LFLKSSNSIAKPKVLNSAALLQRYRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600
DB 541 LFLKSSNSIAKPKVLNSAALLQRYRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600
QY 601 DDDLTYQTFTDLATNSNMFGSGDKNELIIIGAESFVSNKEIYIDKIEFIPVOL 652
DB 601 DDDLTYQTFTDLATNSNMFGSGDKNELIIIGAESFVSNKEIYIDKIEFIPVOL 652

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RESULT 19

AAY23192

ID AAY23192 standard; protein; 652 AA.

XX

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AC AAY23192;
XX 24-AUG-1999 (first entry)
DE Amino acid sequence of Cry3Bb.11242 polypeptide.
XX Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
KW coleoptera; southern corn rootworm; western corn root worm;
KW Diabrotica undecimpunctata howardi Barber; transgenic plant;
KW Diabrotica virgifera LeConte; insecticide resistance.
XX Synthetic.
OS Bacillus thuringiensis.
XX WO9931248-A1.
XX 24-JUN-1999.
XX 17-DEC-1998; 98WO-US026852.
XX 18-DEC-1997; 97US-00993170.
XX 18-DEC-1997; 97US-00993722.
XX 18-DEC-1997; 97US-00993775.
XX 18-DEC-1997; 97US-00996441.
XX (ECOG-) ECOGEN INC.
PA (MONS ) MONSANTO CO.
XX English L, Brussock SM, Malvar TM, Bryson JW, Kulesza CA;
PI Walters FS, Slatin SL, von Tersch MA, Romano C;
XX WPI; 1999-395184/33.
XX Insecticidal Bacillus thuringiensis proteins.
XX Claim 39; Page 384-387; 512pp; English.
XX AAY23172-Y23206, and AAX23208-X23209 represent new Bacillus thuringiensis
CC Cry3Bb mutant proteins. The specification also describes methods of
CC altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
CC polypeptide was modified to have improved insecticidal activity or
CC enhanced insecticidal specificity against a target insect. The
CC modification comprises at least one amino acid substitution, addition, or
CC deletion in the primary sequence of the native or unmodified Cry3Bb
CC polypeptide, wherein the substitution or deletion occurs at a position
CC corresponding to from about amino acids 1-365 of the unmodified
CC polypeptide sequence (AAY23207 represents the wild type Cry3Bb protein).
CC The polypeptide can be used to kill coleopteran pests, especially by
CC application to the environment. It is especially useful against southern
CC corn rootworm and western corn root worm, (Diabrotica undecimpunctata
CC howardi Barber, and Diabrotica virgifera LeConte respectively).
CC The mutant cry3Bb polynucleotides can also be used to produce transgenic
CC plants with increased insecticide resistance
XX
SQ Sequence 652 AA;
Query Match 99.8%; Score 3398; DB 2; Length 652;
Best Local Similarity 99.8%; Pred. No. 3.5e-276;
Matches 651; Conservative 0; Mismatches 1; Indels 0; Gaps 0;
QY 1 MNPNNRSEHDTIKVTPNSELQTNHNOYPLADNPNSTLEELNYKEFLRMTESSSTEVLNDS 60
DB 1 MNPNNRSEHDTIKVTPNSELQTNHNOYPLADNPNSTLEELNYKEFLRMTESSSTEVLNDS 60
QY 61 TVKDVGVTGISVVGQILGVGVFPFAGALTSFYQSFLNTIWPSPDADPWKAFMAQVEVLIDK 120
DB 61 TVKDVGVTGISVVGQILGVGVFPFAGALTSFYQSFLNTIWPSPDADPWKAFMAQVEVLIDK 120
QY 121 KIEEYAKSKALAELOGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRLFSQAESHFRN 180
DB 121 KIEEYAKSKALAELOGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRLFSQAESHFRN 180
QY 181 SMPFSAVSKFEVLFLPTAAQANTHLLLLKDAQVFGEEGYSSSEDVAEFYHRQLKLTQOY 240

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Db

161

SNPFAVSKFEVLFLPTTAAQANTHLLLDKDAQVGEWGYSSDVAEFYHQKLTKQY

240

Qy

241

TDHCNVNNGVGLRGSTYDAWVKNFRPREMTLTVLDLVLPPFYDIRLYSGVKTEL

300

Db

241

TDHCNVNNGVGLRGSTYDAWVKNFRPREMTLTVLDLVLPPFYDIVLYSGVKTEL

300

Qy

301

TRDIFTDPIFSLNTLQEGYPTFLSIRKPHLFDYLGQIEFTRLPQPGYFGKDSFNW

360

Db

301

TRDIFTDPIFSLNTLQEGYPTFLSIRKPHLFDYLGQIEFTRLPQPGYFGKDSFNW

360

Qy

361

SGNYVETRPSIGSSKTIITSPFYGDKSTFPVKLSFDGQKVRTTANTDVAAPNGKVYL

420

Db

361

SGNYVETRPSIGSSKTIITSPFYGDKSTFPVKLSFDGQKVRTTANTDVAAPNGKVYL

420

Qy

421

VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPTTDEPLEKAYSHQLYAE

480

Db

421

VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPTTDEPLEKAYSHQLYAE

480

Qy

481

CFLMDDRRTGTPFFTWTHRSVDFNTIDAETITQLPVVKAYALSSGASIIIEGPGTGNL

540

Db

481

CFLMDDRRTGTPFFTWTHRSVDFNTIDAETITQLPVVKAYALSSGASIIIEGPGTGNL

540

Qy

541

LFLKSSNSIAKPKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNDFLVIYINKTNK

600

Db

541

LFLKSSNSIAKPKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNDFLVIYINKTNK

600

Qy

601

DDDLTYQTPTDLATNSNMFGSGDKNELIIGAESFVSNKIIYIDKIEFIPVQL

652

Db

601

DDDLTYQTPTDLATNSNMFGSGDKNELIIGAESFVSNKIIYIDKIEFIPVQL

652

RESULT 20

AAV23203

ID AAV23203 standard; protein; 652 AA.

XX

AC AAV23203;

XX

DT 24-AUG-1999 (first entry)

XX

DE Amino acid sequence of Cry3Bb.11083 polypeptide.

XX

KW Cry3Bb; mutant; insecticidal activity; insecticidal specificity;

KW coleoptera; southern corn rootworm; western corn root worm;

KW Diabrotica undecimpunctata howardi Barber; transgenic plant;

KW Diabrotica virgifera vergifera LeConte; insecticide resistance.

XX

OS Synthetic.

OS Bacillus thuringiensis.

XX

FN W09931248-A1.

XX

PD 24-JUN-1999.

XX

PF 17-DEC-1998; 98WO-US026852.

XX

PR 18-DEC-1997; 97US-00993170.

PR 18-DEC-1997; 97US-00993722.

PR 18-DEC-1997; 97US-00993775.

PR 18-DEC-1997; 97US-00996441.

XX

PA (ECOG-) ECOGEN INC.

PA (MONS) MONSANTO CO.

XX

PI English L, Brusocco SM, Malvar TM, Bryson JW, Kulesza CA;

PI Walters FS, Slatin SL, Von Tersch MA, Romano C;

XX

DR WPI; 1999-395184/33.

XX

XX Insecticidal Bacillus thuringiensis proteins.

PT

PS Claim 39; Page 446-448; 512pp; English.

XX

XX

CC

AAV23172-Y23206, and AAV23208-X23209 represent new Bacillus thuringiensis

CC

Cry3Bb mutant proteins. The specification also describes methods of

CC

altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb

CC

polypeptide was modified to have improved insecticidal activity or

CC

enhanced insecticidal specificity against a target insect. The

CC

modification comprises at least one amino acid substitution, addition, or

CC

deletion in the primary sequence of the native or unmodified Cry3Bb

CC

polypeptide, wherein the substitution or deletion occurs at a position

CC

corresponding to from about amino acids 1-365 of the unmodified

CC

polypeptide sequence (AAV23207 represents the wild type Cry3Bb protein).

CC

The polypeptide can be used to kill coleopteran pests, especially by

CC

application to the environment. It is especially useful against southern

CC

corn rootworm and western corn root worm, (Diabrotica undecimpunctata

CC

howardi Barber, and Diabrotica virgifera vergifera LeConte respectively).

CC

The mutant cry3Bb polynucleotides can also be used to produce transgenic

XX

plants with increased insecticide resistance

XX

SQ Sequence 652 AA;

Query Match 99.7%; Score 3396; DB 2; Length 652;

Best Local Similarity 99.5%; Pred. No. 5.1e-276;

Matches 649; Conservative 2; Mismatches 1; Indels 0; Gaps 0;

Qy 1 MNPNNRSEHDTIKVTPNSELOQTNHNOYPLADNPSTLEELNYKEFLMTEDSSTEVLDS 60

Db 1 MNPNNRSEHDTIKVTPNSELOQTNHNOYPLADNPSTLEELNYKEFLMTEDSSTEVLDS 60

Qy 61 TVKDAVGTGTSVVGQILGVGVFPAGALTTSFYQSFLNTIWPSDADPKAFMAQVEVLIDK 120

Db 61 TVKDAVGTGTSVVGQILGVGVFPAGALTTSFYQSFLNTIWPSDADPKAFMAQVEVLIDK 120

Qy 121 KIEEYAKSKALAEQLQNNFEDYVNALNSWKKTPLSLRSKRSDRIREFLSQAESFRN 180

Db 121 KIEEYAKSKALAEQLQNNFEDYVNALNSWKKTPLSLRSKRSDRIREFLSQAESFRN 180

Qy 181 SMPFAVSKFEVLFLPTTAAQANTHLLLDKDAQVGEWGYSSDVAEFYHQKLTKQY 240

Db 181 SMPFAVSKFEVLFLPTTAAQANTHLLLDKDAQVGEWGYSSDVAEFYHQKLTKQY 240

Qy 241 TDHCNVNNGVGLRGSTYDAWVKNFRPREMTLTVLDLVLPPFYDIRLYSGVKTEL 300

Db 241 TDHCNVNNGVGLRGSTYDAWVKNFRPREMTLTVLDLVLPPFYDIRLYSGVKTEL 300

Qy 301 TRDIFTDPIFSLNTLQEGYPTFLSIRKPHLFDYLGQIEFTRLPQPGYFGKDSFNW 360

Db 301 TRDIFTDPIFSLNTLQEGYPTFLSIRKPHLFDYLGQIEFTRLPQPGYFGKDSFNW 360

Qy 361 SGNYVETRPSIGSSKTIITSPFYGDKSTFPVKLSFDGQKVRTTANTDVAAPNGKVYL 420

Db 361 SGNYVETRPSIGSSKTIITSPFYGDKSTFPVKLSFDGQKVRTTANTDVAAPNGKVYL 420

Qy 421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPTTDEPLEKAYSHQLYAE 480

Db 421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPTTDEPLEKAYSHQLYAE 480

Qy 481 CFLMDDRRTGTPFFTWTHRSVDFNTIDAETITQLPVVKAYALSSGASIIIEGPGTGNL 540

Db 481 CFLMDDRRTGTPFFTWTHRSVDFNTIDAETITQLPVVKAYALSSGASIIIEGPGTGNL 540

Qy 541 LFLKSSNSIAKPKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNDFLVIYINKTNK 600

Db 541 LFLKSSNSIAKPKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNDFLVIYINKTNK 600

Qy 601 DDLTYQTPTDLATNSNMFGSGDKNELIIGAESFVSNKIIYIDKIEFIPVQL 652

Db 601 DDLTYQTPTDLATNSNMFGSGDKNELIIGAESFVSNKIIYIDKIEFIPVQL 652

RESULT 21

AAV23177

ID AAV23177 standard; protein; 652 AA.

XX

AC AAV23177;


```

XX 24-AUG-1999 (first entry)
XX Amino acid sequence of Cry3Bb.11226 polypeptide.
XX Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
XX coleoptera; southern corn rootworm; western corn root worm;
XX Diabrotica undecimpunctata howardi Barber; transgenic plant;
XX Diabrotica virgifera vergifera LeConte; insecticide resistance.
XX Synthetic.
XX Bacillus thuringiensis.
XX WO9931248-A1.
XX 24-JUN-1999.
XX 17-DEC-1998; 98WO-US026852.
XX 18-DEC-1997; 97US-00993170.
XX 18-DEC-1997; 97US-00993722.
XX 18-DEC-1997; 97US-00993775.
XX 18-DEC-1997; 97US-00996441.
XX (ECOG-) ECOGEN INC.
XX (MONS ) MONSANTO CO.
XX English L, Brussock SM, Malvar TM, Bryson JW, Kulesza CA;
XX Walters FS, Slatin SL, Von Tersch MA, Romano C;
XX WPI; 1999-395184/33.
XX Insecticidal Bacillus thuringiensis proteins.
XX Claim 39; Page 300-302; 512pp; English.
XX AAY23172-Y23206, and AAX23208-X23209 represent new Bacillus thuringiensis
XX Cry3Bb mutant proteins. The specification also describes methods of
XX altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
XX polypeptide was modified to have improved insecticidal activity or
XX enhanced insecticidal specificity against a target insect. The
XX modification comprises at least one amino acid substitution, addition, or
XX deletion in the primary sequence of the native or unmodified Cry3Bb
XX polypeptide, wherein the substitution or deletion occurs at a position
XX corresponding to from about amino acids 1-365 of the unmodified
XX polypeptide sequence (AAY23207 represents the wild type Cry3Bb protein).
XX The polypeptide can be used to kill coleopteran pests, especially by
XX application to the environment. It is especially useful against southern
XX corn rootworm and western corn root worm, (Diabrotica undecimpunctata
XX howardi Barber, and Diabrotica virgifera vergifera LeConte respectively).
XX The mutant cry3Bb polynucleotides can also be used to produce transgenic
XX plants with increased insecticide resistance
XX
XX Query Match 99.7%; Score 3396; DB 2; Length 652;
XX Best Local Similarity 99.8%; Pred. No. 5 1e-276;
XX Matches 651; Conservative 0; Mismatches 1; Indels 0; Gaps 0;
XX
XX 1 MNPNNRSEHDTIKVTNSELQTNHNYPLADNPNSTLEELNKEFLRMTEDSSTEVLNDS 60
XX 1 MNPNNRSEHDTIKVTNSELQTNHNYPLADNPNSTLEELNKEFLRMTEDSSTEVLNDS 60
XX
XX 61 TVKDVGTGIVGVGQILGVGVFPAGALTSPFYOSFLNTIWPSPADPWKAFMAQVEVLIDK 120
XX 61 TVKDVGTGIVGVGQILGVGVFPAGALTSPFYOSFLNTIWPSPADPWKAFMAQVEVLIDK 120
XX
XX 121 KIEEYAKSALAELOGLQNNFEDYVVALNSWKKTPLSLRSKRSQDRIRLFSAQESHFRN 180
XX 121 KIEEYAKSALAELOGLQNNFEDYVVALNSWKKTPLSLRSKRSQDRIRLFSAQESHFRN 180
XX
XX 181 SMPSPAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEGYSSEDAEFYHRLQKLTKQY 240
XX
XX Db
XX Qy
XX Pt
XX Ps
XX Sc
XX
XX 181 SMPSPAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEGYSSEDAEFYHRLQKLTKQY 240
XX 241 TDHCVNWYNVGLNGLRGSTYDAWVKENRFRREMTLVLDLIVLFPFPYDILRLYSGVKTEL 300
XX 241 TDHCVNWYNVGLNGLRGSTYDAWVKENRFRREMTLVLDLIVLFPFPYDILRLYSGVKTEL 300
XX 301 TRDIFTDPIFSLNTLQEGYPTFLSIENSIRKPHLFDYLOQIEFHTRLQPGYFGKDSFNYW 360
XX 301 TRDIFTDPIFSLNTLQEGYPTFLSIENSIRKPHLFDYLOQIEFHTRLQPGYFGKDSFNYW 360
XX 361 SGNVETRPSIGSSKTIITSPFYGDKSTEPVKLSFDGQKVYRTIANTDVAWPNKGYLG 420
XX 361 SGNVETRPSIGSSKTIITSPFYGDKSTEPVKLSFDGQKVYRTIANTDVAWPNKGYLG 420
XX 421 VTKVDFSOYDDQKNETSTQYDSKRNNGHVSAODSIDQLPETTDPLEKAYSHQLNAYE 480
XX 421 VTKVDFSOYDDQKNETSTQYDSKRNNGHVSAODSIDQLPETTDPLEKAYSHQLNAYE 480
XX 481 CFLMDRRRGTIPTFTWTHRSVDFNTIDAEKITQLPVPVKAYALSSGASIIIEGFGFTGNNL 540
XX 481 CFLMDRRRGTIPTFTWTHRSVDFNTIDAEKITQLPVPVKAYALSSGASIIIEGFGFTGNNL 540
XX 541 LFLKSSNSIAKPKVTLSAALLQRYVRIRYASTNNLRFLVQNSNNDFLVIYINKTMNK 600
XX 541 LFLKSSNSIAKPKVTLSAALLQRYVRIRYASTNNLRFLVQNSNNDFLVIYINKTMNK 600
XX 601 DDDLTYQTFLDATTNSNMGFSGDKNELIIIGAESFVSNEKIYIDKIEFIPVOL 652
XX 601 DDDLTYQTFLDATTNSNMGFSGDKNELIIIGAESFVSNEKIYIDKIEFIPVOL 652
XX
XX RESULT 22
XX AAY23176
XX ID AAY23176 standard; protein; 652 AA.
XX AC AAY23176;
XX XX
XX 24-AUG-1999 (first entry)
XX Amino acid sequence of Cry3Bb.11225 polypeptide.
XX Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
XX coleoptera; southern corn rootworm; western corn root worm;
XX Diabrotica undecimpunctata howardi Barber; transgenic plant;
XX Diabrotica virgifera vergifera LeConte; insecticide resistance.
XX Synthetic.
XX Bacillus thuringiensis.
XX WO9931248-A1.
XX 24-JUN-1999.
XX 17-DEC-1998; 98WO-US026852.
XX 18-DEC-1997; 97US-00993170.
XX 18-DEC-1997; 97US-00993722.
XX 18-DEC-1997; 97US-00993775.
XX 18-DEC-1997; 97US-00996441.
XX (ECOG-) ECOGEN INC.
XX (MONS ) MONSANTO CO.
XX English L, Brussock SM, Malvar TM, Bryson JW, Kulesza CA;
XX Walters FS, Slatin SL, Von Tersch MA, Romano C;
XX WPI; 1999-395184/33.
XX Insecticidal Bacillus thuringiensis proteins.
XX Claim 39; Page 294-297; 512pp; English.
XX AAY23172-Y23206, and AAX23208-X23209 represent new Bacillus thuringiensis

```

CC Cry3Bb mutant proteins. The specification also describes methods of
CC altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
CC polypeptide was modified to have improved insecticidal activity or
CC enhanced insecticidal specificity against a target insect. The
CC modification comprises at least one amino acid substitution, addition, or
CC deletion in the primary sequence of the native or unmodified Cry3Bb
CC polypeptide, wherein the substitution or deletion occurs at a position
CC corresponding to from about amino acids 1-365 of the unmodified
CC polypeptide sequence (AA23207 represents the wild type Cry3Bb protein).
CC The polypeptide can be used to kill coleopteran pests, especially by
CC application to the environment. It is especially useful against southern
CC corn rootworm and western corn root worm, (Diabrotica undecimpunctata
CC howardi Barber, and Diabrotica virgifera LeConte respectively).
CC The mutant cry3Bb polynucleotides can also be used to produce transgenic
CC plants with increased insecticide resistance
XX
XX

SQ Sequence 652 AA;
Query Match 99.7%; Score 3395; DB 2; Length 652;
Best Local Similarity 99.7%; Pred. No. 6.2e-276;
Matches 650; Conservative 2; Mismatches 0; Indels 0; Gaps 0;

QY 1 MNPNNRSEHDTIKVTPNSELQTNHQQYPLADNPSTLEELNYKEFLRMTEDSSTVELDNS 60
DB 1 MNPNNRSEHDTIKVTPNSELQTNHQQYPLADNPSTLEELNYKEFLRMTEDSSTVELDNS 60
QY 61 TVKDVGAGTGISVVGQILGVGVPPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120
DB 61 TVKDVGAGTGISVVGQILGVGVPPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120
QY 121 KIEEYAKSKALAEQLQGNFEDYVNALNSWKKTPLSLRSKRSQDRIRLELFSQAESHPFN 180
DB 121 KIEEYAKSKALAEQLQGNFEDYVNALNSWKKTPLSLRSKRSQDRIRLELFSQAESHPFN 180
QY 181 SMPFAVSKFEVLFLPTTAAQAANTHLLLLKDAQVGEWGYSSDVAEFYHRLKLTQOY 240
DB 181 SMPFAVSKFEVLFLPTTAAQAANTHLLLLKDAQVGEWGYSSDVAEFYHRLKLTQOY 240
QY 241 THCVNWNVGLNGRLSGTYDAWKNFRREMTLTVDLIVLFPFYDIRLSKGVKTEL 300
DB 241 SDHCNVNWNVGLNGRLSGTYDAWKNFRREMTLTVDLIVLFPFYDIRLSKGVKTEL 300
QY 301 TRDIFTDFPISLNTIQEYGPTELSTENSRKPHLFDYLGQIEFHTRLQPGYFGKDSFNW 360
DB 301 TRDIFTDFPISLNTIQEYGPTEFLSTENSRKPHLFDYLGQIEFHTRLQPGYFGKDSFNW 360
QY 361 SGNVYETRPSIGSSKTIITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAPNGKVYLG 420
DB 361 SGNVYETRPSIGSSKTIITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAPNGKVYLG 420
QY 421 VTKVDFESQYDDQKNETSTQYDSKRNGHVSQAQSDIDQLPPTTDEPLEKAYSHQINLVAE 480
DB 421 VTKVDFESQYDDQKNETSTQYDSKRNGHVSQAQSDIDQLPPTTDEPLEKAYSHQINLVAE 480
QY 481 CFLMDORRGITPEFTWTHRSVDFNTIDAEKITQLPVVKAYALSSGASIIIEGPGFTGGNL 540
DB 481 CFLMDORRGITPEFTWTHRSVDFNTIDAEKITQLPVVKAYALSSGASIIIEGPGFTGGNL 540
QY 541 LFLKSSNSIAKPKVTLSAALLQRYRVRIRYASTTNLTLFVQNSNNDFLVIYINKTMNK 600
DB 541 LFLKSSNSIAKPKVTLSAALLQRYRVRIRYASTTNLTLFVQNSNNDFLVIYINKTMNK 600
QY 601 DDDLTYOTFDLATTNSMGFSGDKNELIIGAESFVSNKEIYIDKIEFIPVOL 652
DB 601 DDDLTYOTFDLATTNSMGFSGDKNELIIGAESFVSNKEIYIDKIEFIPVOL 652

RESULT 23
AA23188
ID AAY23188 standard; protein; 652 AA.
XX
AC AAY23188;
XX

DT 24-AUG-1999 (first entry)
XX Amino acid sequence of Cry3Bb.11237 polypeptide.
DE Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
KW coleoptera; southern corn rootworm; western corn root worm;
KW Diabrotica undecimpunctata howardi Barber; transgenic plant;
KW Diabrotica virgifera vergifera LeConte; insecticide resistance.
XX
OS Synthetic.
OS Bacillus thuringiensis.
XX WO9931248-A1.
XX
PD 24-JUN-1999.
XX
PF 17-DEC-1998; 98WO-US026852.
XX
PR 18-DEC-1997; 97US-00993170.
PR 18-DEC-1997; 97US-00993722.
PR 18-DEC-1997; 97US-00993775.
PR 18-DEC-1997; 97US-00996441.
XX (ECOG-) ECOGEN INC.
PA (MONS) MONSANTO CO.
XX
PI English L, Brussock SM, Malvar TM, Bryson JW, Kulesza CA;
PI Walters FS, Slatin SL, Von Tersch MA, Romano C;
XX WPI; 1999-395184/33.
XX
XX Insecticidal Bacillus thuringiensis proteins.
XX
PS Claim 39; Page 362-364; 512pp; English.
XX
XX AA23172-X23206, and AA23208-X23209 represent new Bacillus thuringiensis
CC Cry3Bb mutant proteins. The specification also describes methods of
CC altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
CC polypeptide was modified to have improved insecticidal activity or
CC enhanced insecticidal specificity against a target insect. The
CC modification comprises at least one amino acid substitution, addition, or
CC deletion in the primary sequence of the native or unmodified Cry3Bb
CC polypeptide, wherein the substitution or deletion occurs at a position
CC corresponding to from about amino acids 1-365 of the unmodified
CC polypeptide sequence (AA23207 represents the wild type Cry3Bb protein).
CC The polypeptide can be used to kill coleopteran pests, especially by
CC application to the environment. It is especially useful against southern
CC corn rootworm and western corn root worm, (Diabrotica undecimpunctata
CC howardi Barber, and Diabrotica virgifera vergifera LeConte respectively).
CC The mutant cry3Bb polynucleotides can also be used to produce transgenic
CC plants with increased insecticide resistance
XX
XX Sequence 652 AA;

Query Match 99.7%; Score 3395; DB 2; Length 652;
Best Local Similarity 99.7%; Pred. No. 6.2e-276;
Matches 650; Conservative 1; Mismatches 1; Indels 0; Gaps 0;

QY 1 MNPNNRSEHDTIKVTPNSELQTNHQQYPLADNPSTLEELNYKEFLRMTEDSSTVELDNS 60
DB 1 MNPNNRSEHDTIKVTPNSELQTNHQQYPLADNPSTLEELNYKEFLRMTEDSSTVELDNS 60
QY 61 TVKDVGAGTGISVVGQILGVGVPPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120
DB 61 TVKDVGAGTGISVVGQILGVGVPPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120
QY 121 KIEEYAKSKALAEQLQGNFEDYVNALNSWKKTPLSLRSKRSQDRIRLELFSQAESHPFN 180
DB 121 KIEEYAKSKALAEQLQGNFEDYVNALNSWKKTPLSLRSKRSQDRIRLELFSQAESHPFN 180
QY 181 SMPFAVSKFEVLFLPTTAAQAANTHLLLLKDAQVGEWGYSSDVAEFYHRLKLTQOY 240
DB 181 SMPFAVSKFEVLFLPTTAAQAANTHLLLLKDAQVGEWGYSSDVAEFYHRLKLTQOY 240

QY 241 TDHCVMWYVGLNGLRGSTYDAWKFNRRFEMTLTVLDLIVLPFPFYDIRLYSGVKTEL 300
 DB 241 TDHCVMWYVGLNGLRGSTYDAWKFNRRFEMTLTVLDLIVLPFPFYDIRLYSGVKTEL 300
 QY 301 TRDIFTDPIFSLANTLOEYGTFLSIENIRKPHLFDYLOGIEPHTRLOPGYFGKDSFNW 360
 DB 301 TRDIFTDPIFSLANTLOEYGTFLSIENIRKPHLFDYLOGIEPHTRLOPGYFGKDSFNW 360
 QY 361 SGNVETRPISGSKTITSPFYGDKSTPEVKLSFDQKQVYRTIANTDVAWPNKGKVLG 420
 DB 361 SGNVETRPISGSKTITSPFYGDKSTPEVKLSFDQKQVYRTIANTDVAWPNKGKVLG 420
 QY 421 VTKVDFSQYDDQKNETSTQYDSKRNGHVSQAQSIDQLPPTTDEPLEKAYSHQLNYAE 480
 DB 421 VTKVDFSQYDDQKNETSTQYDSKRNGHVSQAQSIDQLPPTTDEPLEKAYSHQLNYAE 480
 QY 481 CFLMQDRRGITPFTTWRHSVDFNTIDAEKITQLPVKAYALSSGASIIIEGPGFTGGNL 540
 DB 481 CFLMQDRRGITPFTTWRHSVDFNTIDAEKITQLPVKAYALSSGASIIIEGPGFTGGNL 540
 QY 541 LFLKESNSIAKFKVTLNSAALLQRYVRIRYASTTNLRLFVQNSNNDFLVIVINKTMNK 600
 DB 541 LFLKESNSIAKFKVTLNSAALLQRYVRIRYASTTNLRLFVQNSNNDFLVIVINKTMNK 600
 QY 601 DDLTYQTFTDLATNSNMGFSGDKNELIIGAESFVSNKEIYIDKIEFIPVOL 652
 DB 601 DDLTYQTFTDLATNSNMGFSGDKNELIIGAESFVSNKEIYIDKIEFIPVOL 652

RESULT 24
 AAY23181
 ID AAY23181 standard; protein; 652 AA.
 XX AC AAY23181;
 XX DT 24-AUG-1999 (first entry)
 XX DE Amino acid sequence of Cry3Bb.11230 polypeptide.
 XX KW Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
 XX KW coleoptera; southern corn rootworm; western corn root worm;
 XX KW Diabrotica undecimpunctata howardi Barber; transgenic plant;
 XX KW Diabrotica virgifera vergifera LeConte; insecticide resistance.
 XX OS Synthetic.
 XX OS Bacillus thuringiensis.
 XX PN WO9931248-A1.
 XX PD 24-JUN-1999.
 XX PF 17-DEC-1998; 98WO-US026852.
 XX PR 18-DEC-1997; 97US-00993170.
 XX PR 18-DEC-1997; 97US-00993722.
 XX PR 18-DEC-1997; 97US-00993775.
 XX PR 18-DEC-1997; 97US-00996441.
 XX PA (ECOG-) ECOGEN INC.
 XX PA (MONS) MONSANTO CO.
 XX PI English L, Brussock SM, Malvar TM, Bryson JW, Kuleeza CA;
 XX PI Walters FS, Slatin SL, Von Tersch MA, Romano C;
 XX DR WPI; 1999-395184/33.
 XX PT Insecticidal Bacillus thuringiensis proteins.
 XX PS Claim 39; Page 322-325; 512pp; English.
 XX CC AAY23172-Y23206, and AAY23208-X23209 represent new Bacillus thuringiensis
 CC Cry3Bb mutant proteins. The specification also describes methods of

CC altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
 CC polypeptide was modified to have improved insecticidal activity or
 CC enhanced insecticidal specificity against a target insect. The
 CC modification comprises at least one amino acid substitution, addition, or
 CC deletion in the primary sequence of the native or unmodified Cry3Bb
 CC polypeptide, wherein the substitution or deletion occurs at a position
 CC corresponding to from amino acids 1-365 of the unmodified
 CC polypeptide sequence (AAY23207 represents the wild type Cry3Bb protein).
 CC The polypeptide can be used to kill coleopteran pests, especially by
 CC application to the environment. It is especially useful against southern
 CC corn rootworm and western corn root worm. (Diabrotica undecimpunctata
 CC howardi Barber, and Diabrotica virgifera vergifera LeConte respectively).
 CC The mutant cry3Bb polynucleotides can also be used to produce transgenic
 CC plants with increased insecticide resistance
 XX SQ Sequence 652 AA;

Query Match 99.6%; Score 3393; DB 2; Length 652;
 Best Local Similarity 99.5%; Pred. No. 9.1e-276;
 Matches 649; Conservative 2; Mismatches 1; Indels 0; Gaps 0;

QY 1 MNPNNRSEHDTIKVTPNSELQTNHNOYPLADNPNTLEELNYKEFLRMTEDSSSTEVLDS 60
 DB 1 MNPNNRSEHDTIKVTPNSELQTNHNOYPLADNPNTLEELNYKEFLRMTEDSSSTEVLDS 60
 QY 61 TVKDAVGTGIVVGVQILGVVGVFPFAGALTSTFYQSFLNTIWPSSDADPWKAPMAQVEVLIDK 120
 DB 61 TVKDAVGTGIVVGVQILGVVGVFPFAGALTSTFYQSFLNTIWPSSDADPWKAPMAQVEVLIDK 120
 QY 121 KIBEYAKSALAELOGLQNNFEDYVNALNSWKKTPLSLRSKRQDRIRRELFSQAESHFN 180
 DB 121 KIBEYAKSALAELOGLQNNFEDYVNALNSWKKTPLSLRSKRQDRIRRELFSQAESHFN 180
 QY 181 SMPSPAVSKFEVLFLPTYQAANTHLLLLKDAQVFGEEGYSSEDAEFVHRQLKLTQQY 240
 DB 181 SMPSPAVSKFEVLFLPTYQAANTHLLLLKDAQVFGEEGYSSEDAEFVHRQLKLTQQY 240
 QY 241 TDHCVMWYVGLNGLRGSTYDAWKFNRRFEMTLTVLDLIVLPFPFYDIRLYSGVKTEL 300
 DB 241 TDHCVMWYVGLNGLRGSTYDAWKFNRRFEMTLTVLDLIVLPFPFYDIRLYSGVKTEL 300
 QY 301 TRDIFTDPIFSLANTLOEYGTFLSIENIRKPHLFDYLOGIEPHTRLOPGYFGKDSFNW 360
 DB 301 TRDIFTDPIFSLANTLOEYGTFLSIENIRKPHLFDYLOGIEPHTRLOPGYFGKDSFNW 360
 QY 361 SGNVETRPISGSKTITSPFYGDKSTPEVKLSFDQKQVYRTIANTDVAWPNKGKVLG 420
 DB 361 SGNVETRPISGSKTITSPFYGDKSTPEVKLSFDQKQVYRTIANTDVAWPNKGKVLG 420
 QY 421 VTKVDFSQYDDQKNETSTQYDSKRNGHVSQAQSIDQLPPTTDEPLEKAYSHQLNYAE 480
 DB 421 VTKVDFSQYDDQKNETSTQYDSKRNGHVSQAQSIDQLPPTTDEPLEKAYSHQLNYAE 480
 QY 481 CFLMQDRRGITPFTTWRHSVDFNTIDAEKITQLPVKAYALSSGASIIIEGPGFTGGNL 540
 DB 481 CFLMQDRRGITPFTTWRHSVDFNTIDAEKITQLPVKAYALSSGASIIIEGPGFTGGNL 540
 QY 541 LFLKESNSIAKFKVTLNSAALLQRYVRIRYASTTNLRLFVQNSNNDFLVIVINKTMNK 600
 DB 541 LFLKESNSIAKFKVTLNSAALLQRYVRIRYASTTNLRLFVQNSNNDFLVIVINKTMNK 600
 QY 601 DDLTYQTFTDLATNSNMGFSGDKNELIIGAESFVSNKEIYIDKIEFIPVOL 652
 DB 601 DDLTYQTFTDLATNSNMGFSGDKNELIIGAESFVSNKEIYIDKIEFIPVOL 652

RESULT 25
 AAY23204
 ID AAY23204 standard; protein; 652 AA.
 XX AC AAY23204;
 XX DT 24-AUG-1999 (first entry)

XX Amino acid sequence of Cry3Bb.11084 polypeptide.

XX Cry3Bb; mutant; insecticidal activity; insecticidal specificity;

KW coleoptera; southern corn rootworm; western corn root worm;

KW Diabrotica undecimpunctata howardi Barber; transgenic plant;

KW Diabrotica virgifera vergifera LeConte; insecticide resistance.

XX Synthetic.

OS Bacillus thuringiensis.

XX WO9931248-Al.

PN 24-JUN-1999.

XX 17-DEC-1998; 98WO-US026852.

XX 18-DEC-1997; 97US-009931170.

PR 18-DEC-1997; 97US-00993722.

PR 18-DEC-1997; 97US-00993775.

PR 18-DEC-1997; 97US-00996441.

XX (ECOG-) ECOGEN INC.

PA (MONS) MONSANTO CO.

XX English L, Brussock SM, Malvar TM, Bryson JW, Kulesza CA;

PI Walters FS, Slatin SL, Von Tersch MA, Romano C;

XX WPI; 1999-395184/33.

DR Insecticidal Bacillus thuringiensis proteins.

PT Claim 39; Page 452-454; 512pp; English.

XX AAY23172-Y23206, and AAY23208-X23209 represent new Bacillus thuringiensis

CC Cry3Bb mutant proteins. The specification also describes methods of

CC altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb

CC polypeptide was modified to have improved insecticidal activity or

CC enhanced insecticidal specificity against a target insect. The

CC modification comprises at least one amino acid substitution, addition, or

CC deletion in the primary sequence of the native or unmodified Cry3Bb

CC polypeptide, wherein the substitution or deletion occurs at a position

CC corresponding to from about amino acids 1-365 of the unmodified

CC polypeptide sequence (AAV23207 represents the wild type Cry3Bb protein).

CC The polypeptide can be used to kill coleopteran pests, especially by

CC application to the environment. It is especially useful against southern

CC corn rootworm and western corn root worm, (Diabrotica undecimpunctata

CC howardi Barber, and Diabrotica virgifera vergifera LeConte respectively).

CC The mutant cry3Bb polynucleotides can also be used to produce transgenic

CC plants with increased insecticide resistance

XX Sequence 652 AA;

SQ

Query Match 99.6%; Score 3393; DB 2; Length 652;

Best Local Similarity 99.7%; Pred. No. 9.1e-276;

Matches 650; Conservative 0; Mismatches 2; Indels 0; Gaps 0;

QY 1 MNPNNRSEHDTTKVTPNSELQTNHQQYPLADNPNSTLEELNYKEFLRMTEDSSTVELDNS 60

DB 1 MNPNNRSEHDTTKVTPNSELQTNHQQYPLADNPNSTLEELNYKEFLRMTEDSSTVELDNS 60

QY 61 TVKDAVGTSISVVGQILGVGVPPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120

DB 61 TVKDAVGTSISVVGQILGVGVPPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120

QY 121 KIEEYAKSKALAELOQLQNNFEDYVNALNSWKTKTPLSLRSKRSQDRIRFLFSQAESHFRN 180

DB 121 KIEEYAKSKALAELOQLQNNFEDYVNALNSWKTKTPLSLRSKRSQDRIRFLFSQAESHFRN 180

QY 181 SMPFAVSKFEVLFTPTAAQANTHLLLLKDAQVFGEEWGYSSSDVAEYFHRQLKLTQY 240

DB 181 SMPFAVSKFEVLFTPTAAQANTHLLLLKDAQVFGEEWGYSSSDVAEYFHRQLKLTQY 240

QY 241 TDHCVNWNVGLNGLRGSTDYDAWKFNFRREMTLTVLDLVLVLPFFDYDIRLSYKGVKTEL 300

DB 241 TDHCVNWNVGLNGLRGSTDYDAWKFNFRREMTLTVLDLVLVLPFFDYDIRLSYKGVKTEL 300

QY 301 TRDIFTDBIFSLNTLOEYGPFTFLSIENSIRKPHLPDYLOQIEFHTRLQPGYFGKDSFNYW 360

DB 301 TRDIFTDBIFSLNTLOEYGPFTFLSIENSIRKPHLPDYLOQIEFHTRLQPGYFGKDSFNYW 360

QY 361 SGNVETRPISGSSKTIITSPFYGDKSTPEVKLSFDGQKVYRTTANTDVAAPNCKVYLG 420

DB 361 SGNVETRPISGSSKTIITSPFYGDKSTPEVKLSFDGQKVYRTTANTDVAAPNCKVYLG 420

QY 421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQSDIDQLPETTTDEPLEKAYSHQLNVAE 480

DB 421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQSDIDQLPETTTDEPLEKAYSHQLNVAE 480

QY 481 CFLMQDRRGTTIPFFTWTHRSVDFNTIDAETITQLPVVKAYALSSGASIIIEGPGTGGNL 540

DB 481 CFLMQDRRGTTIPFFTWTHRSVDFNTIDAETITQLPVVKAYALSSGASIIIEGPGTGGNL 540

QY 541 LFLKSSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDPLVIYINKTNK 600

DB 541 LFLKSSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDPLVIYINKTNK 600

QY 601 DDDLTYQTFLATTNSNMGFSQDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652

DB 601 DDDLTYQTFLATTNSNMGFSQDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652

RESULT 26

AAV23201

ID AAY23201 standard; protein; 652 AA.

XX AC AAY23201;

XX 24-AUG-1999 (first entry)

XX Amino acid sequence of Cry3Bb.11081 polypeptide.

XX Cry3Bb; mutant; insecticidal activity; insecticidal specificity;

KW coleoptera; southern corn rootworm; western corn root worm;

KW Diabrotica undecimpunctata howardi Barber; transgenic plant;

KW Diabrotica virgifera vergifera LeConte; insecticide resistance.

XX Synthetic.

OS Bacillus thuringiensis.

XX WO9931248-Al.

PN 24-JUN-1999.

XX 17-DEC-1998; 98WO-US026852.

XX 18-DEC-1997; 97US-009931170.

PR 18-DEC-1997; 97US-00993722.

PR 18-DEC-1997; 97US-00993775.

PR 18-DEC-1997; 97US-00996441.

XX (ECOG-) ECOGEN INC.

PA (MONS) MONSANTO CO.

XX English L, Brussock SM, Malvar TM, Bryson JW, Kulesza CA;

PI Walters FS, Slatin SL, Von Tersch MA, Romano C;

XX WPI; 1999-395184/33.

DR Insecticidal Bacillus thuringiensis proteins.

PT Claim 39; Page 435-437; 512pp; English.

XX AAY23172-Y23206, and AAY23208-X23209 represent new Bacillus thuringiensis

CC Cry3Bb mutant proteins. The specification also describes methods of

CC altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb

CC polypeptide was modified to have improved insecticidal activity or

CC enhanced insecticidal specificity against a target insect. The

CC modification comprises at least one amino acid substitution, addition, or

CC deletion in the primary sequence of the native or unmodified Cry3Bb

CC polypeptide, wherein the substitution or deletion occurs at a position

CC corresponding to from about amino acids 1-365 of the unmodified

CC polypeptide sequence (AAV23207 represents the wild type Cry3Bb protein).

CC The polypeptide can be used to kill coleopteran pests, especially by

CC application to the environment. It is especially useful against southern

CC corn rootworm and western corn root worm, (Diabrotica undecimpunctata

CC howardi Barber, and Diabrotica virgifera vergifera LeConte respectively).

CC The mutant cry3Bb polynucleotides can also be used to produce transgenic

CC plants with increased insecticide resistance

XX Sequence 652 AA;

SQ

Query Match 99.6%; Score 3393; DB 2; Length 652;

Best Local Similarity 99.7%; Pred. No. 9.1e-276;

Matches 650; Conservative 0; Mismatches 2; Indels 0; Gaps 0;

QY 1 MNPNNRSEHDTTKVTPNSELQTNHQQYPLADNPNSTLEELNYKEFLRMTEDSSTVELDNS 60

DB 1 MNPNNRSEHDTTKVTPNSELQTNHQQYPLADNPNSTLEELNYKEFLRMTEDSSTVELDNS 60

QY 61 TVKDAVGTSISVVGQILGVGVPPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120

DB 61 TVKDAVGTSISVVGQILGVGVPPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120

QY 121 KIEEYAKSKALAELOQLQNNFEDYVNALNSWKTKTPLSLRSKRSQDRIRFLFSQAESHFRN 180

DB 121 KIEEYAKSKALAELOQLQNNFEDYVNALNSWKTKTPLSLRSKRSQDRIRFLFSQAESHFRN 180

QY 181 SMPFAVSKFEVLFTPTAAQANTHLLLLKDAQVFGEEWGYSSSDVAEYFHRQLKLTQY 240

DB 181 SMPFAVSKFEVLFTPTAAQANTHLLLLKDAQVFGEEWGYSSSDVAEYFHRQLKLTQY 240

CC polypeptide was modified to have improved insecticidal activity or
CC enhanced insecticidal specificity against a target insect. The
CC modification comprises at least one amino acid substitution, addition, or
CC deletion in the primary sequence of the native or unmodified Cry3Bb
CC polypeptide, wherein the substitution or deletion occurs at a position
CC corresponding to from about amino acids 1-365 of the unmodified
CC polypeptide sequence (AA23207 represents the wild type Cry3Bb protein).
CC The polypeptide can be used to kill coleopteran pests, especially by
CC application to the environment. It is especially useful against southern
CC corn rootworm and western corn root worm, (Diabrotica undecimpunctata
CC howardi Barber, and Diabrotica virgifera vergifera lecontei respectively).
CC The mutant cry3Bb polynucleotides can also be used to produce transgenic
CC plants with increased insecticide resistance
XX
SQ Sequence 652 AA;

Query Match 99.6%; Score 3392; DB 2; Length 652;
Best Local Similarity 99.5%; Pred. No. 1.1e-275;
Matches 649; Conservative 2; Mismatches 1; Indels 0; Gaps 0;
QY 1 MNPNNRSEHDTIKVTNPSELQTNHNOYPLADNPNSTLEELNYKEFLRMWTSSTEVLDNS 60
DB 1 MNPNNRSEHDTIKVTNPSELQTNHNOYPLADNPNSTLEELNYKEFLRMWTSSTEVLDNS 60
QY 61 TVKDAVGTGIVGVQILGVVGPFPAGALTSFYQSFLNTIWPSSDADPWKAFMAQVEVLIDK 120
DB 61 TVKDAVGTGIVGVQILGVVGPFPAGALTSFYQSFLNTIWPSSDADPWKAFMAQVEVLIDK 120
QY 121 KIEEYAKSKALAELOGLNQNFEDYVNALNSWKKTPLSLRSKRSQDRIRLFSQAESHFRN 180
DB 121 KIEEYAKSKALAELOGLNQNFEDYVNALNSWKKTPLSLRSKRSQDRIRLFSQAESHFRN 180
QY 181 SMPFSAVSKFEVLFLPTYAAQANTHLLKDAQVFGEEWGYSSDVAEFYHROLKLTQQY 240
DB 181 SMPFSAVSKFEVLFLPTYAAQANTHLLKDAQVFGEEWGYSSDVAEFYHROLKLTQQY 240
QY 241 TDHCVNMYNVLNGLRGSTYDAWKFNFRREMTLTVDLILVLPFFYDIRLSKGVKTEL 300
DB 241 TDHCVNMYNVLNGLRGSTYDAWKFNFRREMTLTVDLILVLPFFYDIRLSKGVKTEL 300
QY 301 TRDIFTDPIFSLNTLOBYGTFLSIENSIRKPHLFDYLOGIEFHTRLQPGYFGKDSFNYW 360
DB 301 TRDIFTDPIFSLNTLOBYGTFLSIENSIRKPHLFDYLOGIEFHTRLQPGYFGKDSFNYW 360
QY 361 SGNVETRPISGSKTITSPFYGDKSTEPVQKLSFDGQKVRTIANTDVAWPNKGYL 420
DB 361 SGNVETRPISGSKTITSPFYGDKSTEPVQKLSFDGQKVRTIANTDVAWPNKGYL 420
QY 421 VTKVDFSYDDQKNETSTQTYDSKRNGHVSQAQSDIDQLPETTDEPLEKAYSHQLNYAE 480
DB 421 VTKVDFSYDDQKNETSTQTYDSKRNGHVSQAQSDIDQLPETTDEPLEKAYSHQLNYAE 480
QY 481 CFLMQDRRGITPFTWTHRSVDPFNTIDAEKITQLPVKAYALSSGASIIIEGFGTGGNL 540
DB 481 CFLMQDRRGITPFTWTHRSVDPFNTIDAEKITQLPVKAYALSSGASIIIEGFGTGGNL 540
QY 541 LFLKESNSIAKPKVTLNSAALLQRYVRIRYASTTNLRLFVQNSNNDFLVIVINKTMNK 600
DB 541 LFLKESNSIAKPKVTLNSAALLQRYVRIRYASTTNLRLFVQNSNNDFLVIVINKTMNK 600
QY 601 DDDLTYQTFDLATNSNMGSGDKNELIIGAESFVSNKEIYIDKIEFIPVQL 652
DB 601 DDDLTYQTFDLATNSNMGSGDKNELIIGAESFVSNKEIYIDKIEFIPVQL 652

RESULT 27
AA231186
ID AA231186 standard; protein; 652 AA.

XX
AC AA231186;

XX
DT 24-AUG-1999 (first entry)

DE Amino acid sequence of Cry3Bb.11235 polypeptide.
XX
KW Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
KW coleoptera; southern corn rootworm; western corn root worm;
KW Diabrotica undecimpunctata howardi Barber; transgenic plant;
KW Diabrotica virgifera vergifera lecontei; insecticide resistance.
XX
OS Synthetic.
OS Bacillus thuringiensis.
XX
PN WO9931248-A1.
XX
PD 24-JUN-1999.
XX
PF 17-DEC-1998; 98WO-US026852.
XX
PR 18-DEC-1997; 97US-00993170.
PR 18-DEC-1997; 97US-00993722.
PR 18-DEC-1997; 97US-00993775.
PR 18-DEC-1997; 97US-00996441.
XX
PA (ECOG-) ECOGEN INC.
PA (MONS) MONSANTO CO.
XX
PI English L, Brussock SM, Malvar TM, Bryson JW, Kulesza CA;
PI Walters FS, Slatin SL, Von Tersch MA, Romano C;
XX
XX WPI; 1999-395184/33.
XX
XX Insecticidal Bacillus thuringiensis proteins.
XX
PS Claim 39; Page 351-353; 512pp; English.
XX
CC AA23172-Y23206, and AA23208-X23209 represent new Bacillus thuringiensis
CC Cry3Bb mutant proteins. The specification also describes methods of
CC altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
CC polypeptide was modified to have improved insecticidal activity or
CC enhanced insecticidal specificity against a target insect. The
CC modification comprises at least one amino acid substitution, addition, or
CC deletion in the primary sequence of the native or unmodified Cry3Bb
CC polypeptide, wherein the substitution or deletion occurs at a position
CC corresponding to from about amino acids 1-365 of the unmodified
CC polypeptide sequence (AA23207 represents the wild type Cry3Bb protein).
CC The polypeptide can be used to kill coleopteran pests, especially by
CC application to the environment. It is especially useful against southern
CC corn rootworm and western corn root worm, (Diabrotica undecimpunctata
CC howardi Barber, and Diabrotica virgifera vergifera lecontei respectively).
CC The mutant cry3Bb polynucleotides can also be used to produce transgenic
CC plants with increased insecticide resistance
XX
SQ Sequence 652 AA;

Query Match 99.6%; Score 3392; DB 2; Length 652;
Best Local Similarity 99.7%; Pred. No. 1.1e-275;
Matches 650; Conservative 0; Mismatches 2; Indels 0; Gaps 0;
QY 1 MNPNNRSEHDTIKVTNPSELQTNHNOYPLADNPNSTLEELNYKEFLRMWTSSTEVLDNS 60
DB 1 MNPNNRSEHDTIKVTNPSELQTNHNOYPLADNPNSTLEELNYKEFLRMWTSSTEVLDNS 60
QY 61 TVKDAVGTGIVGVQILGVVGPFPAGALTSFYQSFLNTIWPSSDADPWKAFMAQVEVLIDK 120
DB 61 TVKDAVGTGIVGVQILGVVGPFPAGALTSFYQSFLNTIWPSSDADPWKAFMAQVEVLIDK 120
QY 121 KIEEYAKSKALAELOGLNQNFEDYVNALNSWKKTPLSLRSKRSQDRIRLFSQAESHFRN 180
DB 121 KIEEYAKSKALAELOGLNQNFEDYVNALNSWKKTPLSLRSKRSQDRIRLFSQAESHFRN 180
QY 181 SMPFSAVSKFEVLFLPTYAAQANTHLLKDAQVFGEEWGYSSDVAEFYHROLKLTQQY 240
DB 181 SMPFSAVSKFEVLFLPTYAAQANTHLLKDAQVFGEEWGYSSDVAEFYHROLKLTQQY 240
QY 241 TDHCVNMYNVLNGLRGSTYDAWKFNFRREMTLTVDLILVLPFFYDIRLSKGVKTEL 300

Db 241 TDHCNNWYNGVGLRGSTYDAWVFNPRFRREMTLVLDLVLFFPYDIRLYSGVKTEL 300
QY 301 TRDIFTDFISLNTLQEGPTFLSIENSIRKPHLFDYLGQIEFHTRLQPGYFGKDSFNW 360
Db 301 TRDIFTDFISLNTLQEGPTFLSIENSIRKPHLFDYLGQIEFHTRLQPGYFGKDSFNW 360
QY 361 SGNVETRPSIGSSKTIITSPFYGDKSTBPVKLSFDGQKVYRTIANTDVAAMPNGKVYL 420
Db 361 SGNVETRPSIGSSKTIITSPFYGDKSTBPVKLSFDGQKVYRTIANTDVAAMPNGKVYL 420
QY 421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPTTDEPLEKAYSHQNLV 480
Db 421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPTTDEPLEKAYSHQNLV 480
QY 481 CFLMDRRGTIPFFTWTHRSVDFNTIDAETITQLPVVKAYALSSGASIIIEGPGFTG 540
Db 481 CFLMDRRGTIPFFTWTHRSVDFNTIDAETITQLPVVKAYALSSGASIIIEGPGFTG 540
QY 541 LFLKSSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNDFLVIYINKTM 600
Db 541 LFLKSSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNDFLVIYINKTM 600
QY 601 DDDLTYQTFDLATTTNSNMFGSGDKNELIIIGAESFVSNEKIYIDKIEFIPVQL 652
Db 601 DDDLTYQTFDLATTTNSNMFGSGDKNELIIIGAESFVSNEKIYIDKIEFIPVQL 652

RESULT 28
AAV23179
ID AAY23179 standard; protein; 652 AA.

AC AAY23179;

DT 24-AUG-1999 (first entry)

XX Amino acid sequence of Cry3Bb.11228 polypeptide.

XX Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
KW coleoptera; southern corn rootworm; western corn root worm;
KW Diabrotica undecimpunctata howardi Barber; transgenic plant;
KW Diabrotica virgifera vergifera LeConte; insecticide resistance.

XX Synthetic.
OS Bacillus thuringiensis.

XX W0931248-A1.

XX 24-JUN-1999.

XX 17-DEC-1998; 98WO-US026852.

XX 18-DEC-1997; 97US-00993170.

XX 18-DEC-1997; 97US-00993722.

XX 18-DEC-1997; 97US-00993775.

XX 18-DEC-1997; 97US-00996441.

XX (ECOG-) ECOGEN INC.

XX (MONS) MONSANTO CO.

XX English L, Brussock SM, Malvar TM, Bryson JW, Kulesza CA;

XX Walters FS, Slatin SL, Von Tersch MA, Romano C;

XX WPI; 1999-395184/33.

XX Insecticidal Bacillus thuringiensis proteins.

XX Claim 39; Page 311-313; 512pp; English.

XX AAY23172-Y23206, and AAY23208-X23209 represent new Bacillus thuringiensis

CC Cry3Bb mutant proteins. The specification also describes methods of

CC altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb

CC polypeptide was modified to have improved insecticidal activity or

CC enhanced insecticidal specificity against a target insect. The
CC modification comprises at least one amino acid substitution, addition, or
CC deletion in the primary sequence of the native or unmodified Cry3Bb
CC polypeptide, wherein the substitution or deletion occurs at a position
CC corresponding to from about amino acids 1-365 of the unmodified
CC polypeptide sequence (AAY23207 represents the wild type Cry3Bb protein).
CC The polypeptide can be used to kill coleopterian pests, especially by
CC application to the environment. It is especially useful against southern
CC corn rootworm and western corn root worm, (Diabrotica undecimpunctata
CC Howard Barber, and Diabrotica virgifera vergifera Leconte respectively).
CC The mutant cry3Bb polynucleotides can also be used to produce transgenic
CC plants with increased insecticide resistance

XX Sequence 652 AA;

QY Query Match 99.5%; Score 3390; DB 2; Length 652;
Best Local Similarity 99.5%; Pred. No. 1.6e-275;
Matches 649; Conservative 1; Mismatches 2; Indels 0; Gaps 0;

QY 1 MNPNNRSEHDTIKVTPNSELQTNHNOYPLADNPNSTLEELNYKEFLRMTESSSTEVL 60

Db 1 MNPNNRSEHDTIKVTPNSELQTNHNOYPLADNPNSTLEELNYKEFLRMTESSSTEVL 60

QY 61 TVKDAVGTGISVVGQILGVGVPPFAGALTSPYQSFLNTIWPSDADPWKAFMAQVEVL 120

Db 61 TVKDAVGTGISVVGQILGVGVPPFAGALTSPYQSFLNTIWPSDADPWKAFMAQVEVL 120

QY 121 KIEEYAKSKALAEIQLQNNFEDYVNALNSWKTKPLSLRSKRSODRTRELPSQAESHP 180

Db 121 KIEEYAKSKALAEIQLQNNFEDYVNALNSWKTKPLSLRSKRSODRTRELPSQAESHP 180

QY 181 SMPSFVSKFVFLPTVAQAANTHLLLLKDAQVGEWGYSSDEVAFYHRLKLTQY 240

Db 181 SMPSFVSKFVFLPTVAQAANTHLLLLKDAQVGEWGYSSDEVAFYHRLKLTQY 240

QY 241 TDHCNNWYNGVGLRGSTYDAWVKFNFRREMTLVLDLVLFFPYDIRLYSGVKTEL 300

Db 241 TDHCNNWYNGVGLRGSTYDAWVKFNFRREMTLVLDLVLFFPYDIRLYSGVKTEL 300

QY 301 TRDIFTDFISLNTLQEGPTFLSIENSIRKPHLFDYLGQIEFHTRLQPGYFGKDSFNW 360

Db 301 TRDIFTDFISLNTLQEGPTFLSIENSIRKPHLFDYLGQIEFHTRLQPGYFGKDSFNW 360

QY 361 SGNVETRPSIGSSKTIITSPFYGDKSTBPVKLSFDGQKVYRTIANTDVAAMPNGKVYL 420

Db 361 SGNVETRPSIGSSKTIITSPFYGDKSTBPVKLSFDGQKVYRTIANTDVAAMPNGKVYL 420

QY 421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPTTDEPLEKAYSHQNLV 480

Db 421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPTTDEPLEKAYSHQNLV 480

QY 481 CFLMDRRGTIPFFTWTHRSVDFNTIDAETITQLPVVKAYALSSGASIIIEGPGFTG 540

Db 481 CFLMDRRGTIPFFTWTHRSVDFNTIDAETITQLPVVKAYALSSGASIIIEGPGFTG 540

QY 541 LFLKSSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNDFLVIYINKTM 600

Db 541 LFLKSSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNDFLVIYINKTM 600

QY 601 DDDLTYQTFDLATTTNSNMFGSGDKNELIIIGAESFVSNEKIYIDKIEFIPVQL 652

Db 601 DDDLTYQTFDLATTTNSNMFGSGDKNELIIIGAESFVSNEKIYIDKIEFIPVQL 652

RESULT 29

AAV23191

ID AAY23191 standard; protein; 652 AA.

XX AAY23191;

XX 24-AUG-1999 (first entry)

DE Amino acid sequence of Cry3Bb.11241 polypeptide.

```

XX Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
KW coleoptera; southern corn rootworm; western corn root worm;
KW Diabrotica undecimpunctata howardi Barber; transgenic plant;
KW Diabrotica virgifera vergifera LeConte; insecticide resistance.
XX
OS Synthetic.
OS Bacillus thuringiensis.
XX
XX WO9931248-A1.
XX
XX 24-JUN-1999.
XX
XX 17-DEC-1998; 98WO-US026852.
XX
XX 18-DEC-1997; 97US-00993170.
XX 18-DEC-1997; 97US-00993722.
XX 18-DEC-1997; 97US-00993775.
XX 18-DEC-1997; 97US-00996441.
XX
XX (ECOG-) ECOGEN INC.
XX (MONS ) MONSANTO CO.
XX
XX English L, Brussock SM, Malvar TM, Bryson JW, Kulesza CA;
XX Walters FS, Slatin SL, Von Tersch MA, Romano C;
XX WPI; 1999-395184/33.
XX
XX Insecticidal Bacillus thuringiensis proteins.
XX
XX Claim 39; Page 379-381; 512pp; English.
XX
XX AAY23172-Y23206, and AAX23208-X23209 represent new Bacillus thuringiensis
CC Cry3Bb mutant proteins. The specification also describes methods of
CC altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
CC polypeptide was modified to have improved insecticidal activity or
CC enhanced insecticidal specificity against a target insect. The
CC modification comprises at least one amino acid substitution, addition, or
CC deletion in the primary sequence of the native or unmodified Cry3Bb
CC polypeptide, wherein the substitution or deletion occurs at a position
CC corresponding to from amino acids 1-365 of the unmodified
CC polypeptide sequence (AAY23207 represents the wild type Cry3Bb protein).
CC The polypeptide can be used to kill coleopteran pests, especially by
CC application to the environment. It is especially useful against southern
CC corn rootworm and western corn root worm, (Diabrotica undecimpunctata
CC howardi Barber, and Diabrotica virgifera vergifera LeConte respectively).
CC The mutant cry3Bb polynucleotides can also be used to produce transgenic
CC plants with increased insecticide resistance
XX
XX Sequence 652 AA;
XX
XX Query Match 99.5%; Score 3390; DB 2; Length 652;
XX Best Local Similarity 99.5%; Pred. No. 1.6e-275;
XX Matches 649; Conservative 2; Mismatches 1; Indels 0; Gaps 0;
XX
XX 1 MNPNNRSEHDTIKVTPNSELQTHNQYPLADNPNSTLEELNYKEFLRWMTSDSSTEVLNLS 60
XX |||||||
XX 1 MNPNNRSEHDTIKVTPNSELQTHNQYPLADNPNSTLEELNYKEFLRWMTSDSSTEVLNLS 60
XX
XX 61 TVKDAVGTGISVVGQILGVGVFPAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120
XX |||||||
XX 61 TVKDAVGTGISVVGQILGVGVFPAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120
XX
XX 121 KIEEYAKSKALAEQLQGNPFEDVYNALNSKKTKPLSLRSKRSQDRIRLFSQAESHFRN 180
XX |||||||
XX 121 KIEEYAKSKALAEQLQGNPFEDVYNALNSKKTKPLSLRSKRSQDRIRLFSQAESHFRN 180
XX
XX 181 SMPSPAVSKPEVLPLPTYAQAANTHLALLKDAQVFGGEWGYSEDVAEFVHROKLTKQY 240
XX |||||||
XX 181 SMPSPAVSKPEVLPLPTYAQAANTHLALLKDAQVFGGEWGYSEDVAEFVHROKLTKQY 240
XX
XX 241 TDHCVNMYNVGLNGRGSTYDAWVKFNFRREMTLTVDLILVFPFFNILLYSGVKTEL 300
XX |||||||

```

```

Db 241 TDHCVNMYNVGLNGRGSTYDAWVKFNFRREMTLTVDLILVFPFFNILLYSGVKTEL 300
Qy 301 TRDIFTDFPSLNTLOEYGTPELSIENSRKPHLPDYLOGIEHETRLQPCYFGKDSFNW 360
Db 301 TRDIFTDFPSLNTLOEYGTPELSIENSRKPHLPDYLOGIEHETRLQPCYFGKDSFNW 360
Qy 361 SGNVETRPSIGSSKTIITSPFYGDKSTPEVQKLSFDGQKVYRTIANTDVAAPNGKYVLG 420
Db 361 SGNVETRPSIGSSKTIITSPFYGDKSTPEVQKLSFDGQKVYRTIANTDVAAPNGKYVLG 420
Qy 421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAODSIDQLPPETDPLEKAYSHQLNAYE 480
Db 421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAODSIDQLPPETDPLEKAYSHQLNAYE 480
Qy 481 CFLMQDRRGITPFFTWTHTSRVDFNTIDAEKITQLPVKAYALSSGASIIIEGPGFTGNNL 540
Db 481 CFLMQDRRGITPFFTWTHTSRVDFNTIDAEKITQLPVKAYALSSGASIIIEGPGFTGNNL 540
Qy 541 LFLKESNSIAKFKVTLNSAALLQRYVRIRYASTTTLNRLFVQNSNNDFLVIYINKTMNK 600
Db 541 LFLKESNSIAKFKVTLNSAALLQRYVRIRYASTTTLNRLFVQNSNNDFLVIYINKTMNK 600
Qy 601 DDDLTYTQTFDLATTNSNMGFSGDKNELIIGASFSVNEKIYIDKIBFIPVQL 652
Db 601 DDDLTYTQTFDLATTNSNMGFSGDKNELIIGASFSVNEKIYIDKIBFIPVQL 652

RESULT 30
AAY23180
ID AAY23180 standard; protein; 652 AA.
XX
XX AAY23180;
XX
XX 24-AUG-1999 (first entry)
XX
XX Amino acid sequence of Cry3Bb.11229 polypeptide.
DE
DE Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
KW coleoptera; southern corn rootworm; western corn root worm;
KW Diabrotica undecimpunctata howardi Barber; transgenic plant;
KW Diabrotica virgifera vergifera LeConte; insecticide resistance.
XX
XX Synthetic.
XX Bacillus thuringiensis.
XX
XX WO9931248-A1.
XX
XX 24-JUN-1999.
XX
XX 17-DEC-1998; 98WO-US026852.
XX
XX 18-DEC-1997; 97US-00993170.
XX 18-DEC-1997; 97US-00993722.
XX 18-DEC-1997; 97US-00993775.
XX 18-DEC-1997; 97US-00996441.
XX
XX (ECOG-) ECOGEN INC.
XX (MONS ) MONSANTO CO.
XX
XX English L, Brussock SM, Malvar TM, Bryson JW, Kulesza CA;
XX Walters FS, Slatin SL, Von Tersch MA, Romano C;
XX WPI; 1999-395184/33.
XX
XX Insecticidal Bacillus thuringiensis proteins.
XX
XX Claim 39; Page 317-319; 512pp; English.
XX
XX AAY23172-Y23206, and AAX23208-X23209 represent new Bacillus thuringiensis
CC Cry3Bb mutant proteins. The specification also describes methods of
CC altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
CC polypeptide was modified to have improved insecticidal activity or
CC enhanced insecticidal specificity against a target insect. The
CC modification comprises at least one amino acid substitution, addition, or
CC deletion in the primary sequence of the native or unmodified Cry3Bb
CC polypeptide, wherein the substitution or deletion occurs at a position
CC corresponding to from amino acids 1-365 of the unmodified
CC polypeptide sequence (AAY23207 represents the wild type Cry3Bb protein).
CC The polypeptide can be used to kill coleopteran pests, especially by
CC application to the environment. It is especially useful against southern
CC corn rootworm and western corn root worm, (Diabrotica undecimpunctata
CC howardi Barber, and Diabrotica virgifera vergifera LeConte respectively).
CC The mutant cry3Bb polynucleotides can also be used to produce transgenic
CC plants with increased insecticide resistance
XX
XX Sequence 652 AA;
XX
XX Query Match 99.5%; Score 3390; DB 2; Length 652;
XX Best Local Similarity 99.5%; Pred. No. 1.6e-275;
XX Matches 649; Conservative 2; Mismatches 1; Indels 0; Gaps 0;
XX
XX 1 MNPNNRSEHDTIKVTPNSELQTHNQYPLADNPNSTLEELNYKEFLRWMTSDSSTEVLNLS 60
XX |||||||
XX 1 MNPNNRSEHDTIKVTPNSELQTHNQYPLADNPNSTLEELNYKEFLRWMTSDSSTEVLNLS 60
XX
XX 61 TVKDAVGTGISVVGQILGVGVFPAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120
XX |||||||
XX 61 TVKDAVGTGISVVGQILGVGVFPAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120
XX
XX 121 KIEEYAKSKALAEQLQGNPFEDVYNALNSKKTKPLSLRSKRSQDRIRLFSQAESHFRN 180
XX |||||||
XX 121 KIEEYAKSKALAEQLQGNPFEDVYNALNSKKTKPLSLRSKRSQDRIRLFSQAESHFRN 180
XX
XX 181 SMPSPAVSKPEVLPLPTYAQAANTHLALLKDAQVFGGEWGYSEDVAEFVHROKLTKQY 240
XX |||||||
XX 181 SMPSPAVSKPEVLPLPTYAQAANTHLALLKDAQVFGGEWGYSEDVAEFVHROKLTKQY 240
XX
XX 241 TDHCVNMYNVGLNGRGSTYDAWVKFNFRREMTLTVDLILVFPFFNILLYSGVKTEL 300
XX |||||||

```

CC modification comprises at least one amino acid substitution, addition, or
CC deletion in the primary sequence of the native or unmodified Cry3Bb
CC polypeptide, wherein the substitution or deletion occurs at a position
CC corresponding to from about amino acids 1-365 of the unmodified
CC polypeptide sequence (AAV23207 represents the wild type Cry3Bb protein).
CC The polypeptide can be used to kill coleopteran pests, especially by
CC application to the environment. It is especially useful against southern
CC corn rootworm and western corn root worm, (Diabrotica undecimpunctata
CC howardi Barber, and Diabrotica virgifera vergifera LeConte respectively).
CC The mutant cry3Bb polynucleotides can also be used to produce transgenic
CC plants with increased insecticide resistance
XX
SQ Sequence 652 AA;

Query Match 99.5%; Score 3390; DB 2; Length 652;
Best Local Similarity 99.5%; Pred. No. 1.6e-275;
Matches 649; Conservative 2; Mismatches 1; Indels 0; Gaps 0;
QY 1 MNPNNRSEHDTIKVTPNSELOTHNQYPLADNPSTLEELNYKEFLRMTEDSSTVLNDS 60
Db 1 MNPNNRSEHDTIKVTPNSELOTHNQYPLADNPSTLEELNYKEFLRMTEDSSTVLNDS 60
QY 61 TVKDAVGTGISVVGQILGVGVFPFAGALTSFYQSFINTIWPSDADPWKAFMAQVLELIDK 120
Db 61 TVKDAVGTGISVVGQILGVGVFPFAGALTSFYQSFINTIWPSDADPWKAFMAQVLELIDK 120
QY 121 KIEEYAKSKALAELOGLQNNFEDYVNALNSWKTPLSLRKSKSDRIREFLSQAESHFEN 180
Db 121 KIEEYAKSKALAELOGLQNNFEDYVNALNSWKTPLSLRKSKSDRIREFLSQAESHFEN 180
QY 181 SMPSPAVSKFEVLFLPTVAQAANTHLLLLKDAQVGEWGYSSDVAEFYHRLQKLTOQY 240
Db 181 SMPSPAVSKFEVLFLPTVAQAANTHLLLLKDAQVGEWGYSSDVAEFYHRLQKLTOQY 240
QY 241 TDHCNVNWNVGLNGLRGTYDAWVKNFRFRREMTLTVDLIVLFPFYDIRLYSKGVKTEL 300
Db 241 TDHCNVNWNVGLNGLRGTYDAWVKNFRFRREMTLTVDLIVLFPFYDIRLYSKGVKTEL 300
QY 301 TRDIETDPIFTLNTLOKCGFTFLSIENSIRKPHLFDYLGQIFHTRLOPGYFGKDSFNW 360
Db 301 TRDIETDPIFTLNTLOKCGFTFLSIENSIRKPHLFDYLGQIFHTRLOPGYFGKDSFNW 360
QY 361 SGNYVETRSPGSSKTIITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAPNGKVILG 420
Db 361 SGNYVETRSPGSSKTIITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAPNGKVILG 420
QY 421 VTKVDFSQVDDQKNETSTQYDSKRNNGHVSAQDSIDQLPPETDEPLEKAYSHQLNVAE 480
Db 421 VTKVDFSQVDDQKNETSTQYDSKRNNGHVSAQDSIDQLPPETDEPLEKAYSHQLNVAE 480
QY 481 CFLMDRRGTIPFTTWRHSVDFNTIDAETITOLPVVKAYALSSGASTIEGPGFTGGNL 540
Db 481 CFLMDRRGTIPFTTWRHSVDFNTIDAETITOLPVVKAYALSSGASTIEGPGFTGGNL 540
QY 541 LFLKSSNSIAKFVTLNSAALLQRYVRIRYASTTNLFLVQNSNNDPLVIYINKTNWK 600
Db 541 LFLKSSNSIAKFVTLNSAALLQRYVRIRYASTTNLFLVQNSNNDPLVIYINKTNWK 600
QY 601 DDDLTVTQTPDLATNSMFGSGDKNELIIGASFSVSNKIIYDKIEFIPVOL 652
Db 601 DDDLTVTQTPDLATNSMFGSGDKNELIIGASFSVSNKIIYDKIEFIPVOL 652

RESULT 31
AAV23173
ID AAV23173 standard; protein; 652 AA.
XX
AC AAV23173;
DT
XX 24-AUG-1999 (first entry)
XX Amino acid sequence of Cry3Bb.11222 polypeptide.
XX

KW Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
KW coleoptera; southern corn rootworm; western corn root worm;
KW Diabrotica undecimpunctata howardi Barber; transgenic plant;
KW Diabrotica virgifera vergifera LeConte; insecticide resistance.
XX
OS Synthetic.
OS Bacillus thuringiensis.
PN WO9931248-A1.
XX
PD 24-JUN-1999.
XX
PF 17-DEC-1998; 98WO-US026852.
XX
PR 18-DEC-1997; 97US-00993170.
PR 18-DEC-1997; 97US-00993722.
PR 18-DEC-1997; 97US-00993775.
PR 18-DEC-1997; 97US-00996441.
XX
PA (ECOG-) ECOGEN INC.
PA (MONS) MONSANTO CO.
XX
PI English L, Brussock SM, Malvar TM, Bryson JW, Kulesza CA;
PI Walters FS, Slatin SL, Von Tersch MA, Romano C;
XX
DR WPI; 1999-395184/33.
XX
XX Insecticidal Bacillus thuringiensis proteins.
PT
PS Claim 39; Page 277-280; 512pp; English.
XX
CC AAV23172-Y23206, and AAX23208-X23209 represent new Bacillus thuringiensis
CC Cry3Bb mutant proteins. The specification also describes methods of
CC altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
CC polypeptide was modified to have improved insecticidal activity or
CC enhanced insecticidal specificity against a target insect. The
CC modification comprises at least one amino acid substitution, addition, or
CC deletion in the primary sequence of the native or unmodified Cry3Bb
CC polypeptide, wherein the substitution or deletion occurs at a position
CC corresponding to from about amino acids 1-365 of the unmodified
CC polypeptide sequence (AAV23207 represents the wild type Cry3Bb protein).
CC The polypeptide can be used to kill coleopteran pests, especially by
CC application to the environment. It is especially useful against southern
CC corn rootworm and western corn root worm, (Diabrotica undecimpunctata
CC howardi Barber, and Diabrotica virgifera vergifera LeConte respectively).
CC The mutant cry3Bb polynucleotides can also be used to produce transgenic
CC plants with increased insecticide resistance
XX
SQ Sequence 652 AA;

Query Match 99.5%; Score 3389; DB 2; Length 652;
Best Local Similarity 99.7%; Pred. No. 2e-275; Mismatches 0; Indels 0; Gaps 0;
Matches 650; Conservative 0; Mismatches 2; Indels 0; Gaps 0;
QY 1 MNPNNRSEHDTIKVTPNSELOTHNQYPLADNPSTLEELNYKEFLRMTEDSSTVLNDS 60
Db 1 MNPNNRSEHDTIKVTPNSELOTHNQYPLADNPSTLEELNYKEFLRMTEDSSTVLNDS 60
QY 61 TVKDAVGTGISVVGQILGVGVFPFAGALTSFYQSFINTIWPSDADPWKAFMAQVLELIDK 120
Db 61 TVKDAVGTGISVVGQILGVGVFPFAGALTSFYQSFINTIWPSDADPWKAFMAQVLELIDK 120
QY 121 KIEEYAKSKALAELOGLQNNFEDYVNALNSWKTPLSLRKSKSDRIREFLSQAESHFEN 180
Db 121 KIEEYAKSKALAELOGLQNNFEDYVNALNSWKTPLSLRKSKSDRIREFLSQAESHFEN 180
QY 181 SMPSPAVSKFEVLFLPTVAQAANTHLLLLKDAQVGEWGYSSDVAEFYHRLQKLTOQY 240
Db 181 SMPSPAVSKFEVLFLPTVAQAANTHLLLLKDAQVGEWGYSSDVAEFYHRLQKLTOQY 240
QY 241 TDHCNVNWNVGLNGLRGTYDAWVKNFRFRREMTLTVDLIVLFPFYDIRLYSKGVKTEL 300
Db 241 TDHCNVNWNVGLNGLRGTYDAWVKNFRFRREMTLTVDLIVLFPFYDIRLYSKGVKTEL 300


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QY 301 TRDIFTDPIFSLNTLOEYGTFTLSIENSIKPHLFDYLOGIEFHTRLOPGYFGKDSFNYW 360
DB 301 TRDIFTDPIFSLNTLOEYGTFTLSIENSIKPHLFDYLOGIEFHTRLOPGYFGKDSFNYW 360
QY 361 SGNVETRPISIGSKTITSPFYGDKSTPEPVOKLSFDGQKYVRTIANTDVAAMPNGKVYLG 420
DB 361 SGNVETRPISIGSKTITSPFYGDKSTPEPVOKLSFDGQKYVRTIANTDVAAMPNGKVYLG 420
QY 421 VTKVDFSOYDDQKNETSTQYDSKRNGHVSQAODSIDOLPETTDEPLEKAYSHQNLNAYE 480
DB 421 VTKVDFSOYDDQKNETSTQYDSKRNGHVSQAODSIDOLPETTDEPLEKAYSHQNLNAYE 480
QY 481 CFLMDRRGTIPFPTWTHRSVDFNTDAEKITQLPVVKAYALSSGASIIIEGPGFTGGNL 540
DB 481 CFLMDRRGTIPFPTWTHRSVDFNTDAEKITQLPVVKAYALSSGASIIIEGPGFTGGNL 540
QY 541 LFLKESNSIAKPKVTLNSAALLQRYVRIRYASTTNLRLFVQNSNDFLVIYINKTMNK 600
DB 541 LFLKESNSIAKPKVTLNSAALLQRYVRIRYASTTNLRLFVQNSNDFLVIYINKTMNK 600
QY 601 DDDLTYQTFDLATNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVOL 652
DB 601 DDDLTYQTFDLATNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVOL 652

RESULT 32
AA23197
ID AAY23197 standard; protein; 651 AA.
XX AC AAY23197;
XX DT 24-AUG-1999 (first entry)
DE Amino acid sequence of Cry3Bb.11048 polypeptide.
XX KW Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
XX KW coleoptera; southern corn rootworm; western corn root worm;
XX KW Diabrotica undecimpunctata howardi Barber; transgenic plant;
XX KW Diabrotica virgifera vergifera LeConte; insecticide resistance.
XX OS Synthetic.
XX OS Bacillus thuringiensis.
XX PN WO9931248-A1.
XX PD 24-JUN-1999.
XX PF 17-DEC-1998; 98WO-US026852.
XX PR 18-DEC-1997; 97US-00993170.
XX PR 18-DEC-1997; 97US-00993722.
XX PR 18-DEC-1997; 97US-00993775.
XX PR 18-DEC-1997; 97US-00996441.
XX PA (ECOG-) ECOGEN INC.
XX PA (MONS ) MONSANTO CO.
XX PI English L, Brussock SM, Malvar TM, Bryson JW, Kulesza CA;
XX PI Walters FS, Slatin SL, Von Tersch MA, Romano C;
XX WI 1999-395184/33.
XX DR Insecticidal Bacillus thuringiensis proteins.
XX PT Claim 39; Page 412-415; 512pp; English.
XX CC AAY23172-Y23206, and AAY23208-X23209 represent new Bacillus thuringiensis
XX CC Cry3Bb mutant proteins. The specification also describes methods of
XX CC altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
XX CC polypeptide was modified to have improved insecticidal activity or
XX CC enhanced insecticidal specificity against a target insect. The
XX CC modification comprises at least one amino acid substitution, addition, or

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CC deletion in the primary sequence of the native or unmodified Cry3Bb
CC polypeptide, wherein the substitution or deletion occurs at a position
CC corresponding to from about amino acids 1-365 of the unmodified
CC polypeptide sequence (AA23207 represents the wild type Cry3Bb protein).
CC The polypeptide can be used to kill coleopteran pests, especially by
CC application to the environment. It is especially useful against southern
CC corn rootworm and western corn root worm, (Diabrotica undecimpunctata
CC howardi Barber, and Diabrotica virgifera vergifera LeConte respectively).
CC The mutant cry3bb polynucleotides can also be used to produce transgenic
CC plants with increased insecticide resistance
XX SQ Sequence 651 AA;
Query Match 99.5%; Score 3387.5; DB 2; Length 651;
Best Local Similarity 99.7%; Pred. No. 2.6e-275;
Matches 650; Conservative 1; Mismatches 0; Indels 1; Gaps 1;

QY 1 MNPNNRSEHDTIKVTNPSELQTNHNOYPLADNPSTLEELNYKEFLRMTDSSTEVLDNS 60
DB 1 MNPNNRSEHDTIKVTNPSELQTNHNOYPLADNPSTLEELNYKEFLRMTDSSTEVLDNS 60
QY 61 TVKDAVGTGISVVGQILGVVGVFPFAGALTSTFYQSPLNTIWPSDADPWKAPMAQVEVLIDK 120
DB 61 TVKDAVGTGISVVGQILGVVGVFPFAGALTSTFYQSPLNTIWPSE-DPWKAPMAQVEVLIDK 119
QY 121 KIEEYAKSKALAELOQLQNNFEDYVNALNSWKKTPLSLRSKRSDRIRELFSOAESHFRN 180
DB 121 KIEEYAKSKALAELOQLQNNFEDYVNALNSWKKTPLSLRSKRSDRIRELFSOAESHFRN 179
QY 181 SMPFAVSFPEVLFLPTYAQAANTHLLLLKDAQVGEEMGYSSSEDVAEFYHRQLKLTQOY 240
DB 181 SMPFAVSFPEVLFLPTYAQAANTHLLLLKDAQVGEEMGYSSSEDVAEFYHRQLKLTQOY 239
QY 241 THCVNWNVYVGLNGLRGSTYDAWVKFNFRREMTLTVDLIVLFPFYDIRLYSKGVKTEL 300
DB 241 THCVNWNVYVGLNGLRGSTYDAWVKFNFRREMTLTVDLIVLFPFYDIRLYSKGVKTEL 299
QY 301 TRDIFTDPIFSLNTLOEYGTFTLSIENSIKPHLFDYLOGIEFHTRLOPGYFGKDSFNYW 360
DB 301 TRDIFTDPIFSLNTLOEYGTFTLSIENSIKPHLFDYLOGIEFHTRLOPGYFGKDSFNYW 359
QY 361 SGNVETRPISIGSKTITSPFYGDKSTPEPVOKLSFDGQKYVRTIANTDVAAMPNGKVYLG 420
DB 361 SGNVETRPISIGSKTITSPFYGDKSTPEPVOKLSFDGQKYVRTIANTDVAAMPNGKVYLG 419
QY 421 VTKVDFSOYDDQKNETSTQYDSKRNGHVSQAODSIDOLPETTDEPLEKAYSHQNLNAYE 480
DB 421 VTKVDFSOYDDQKNETSTQYDSKRNGHVSQAODSIDOLPETTDEPLEKAYSHQNLNAYE 479
QY 481 CFLMDRRGTIPFPTWTHRSVDFNTDAEKITQLPVVKAYALSSGASIIIEGPGFTGGNL 540
DB 481 CFLMDRRGTIPFPTWTHRSVDFNTDAEKITQLPVVKAYALSSGASIIIEGPGFTGGNL 539
QY 541 LFLKESNSIAKPKVTLNSAALLQRYVRIRYASTTNLRLFVQNSNDFLVIYINKTMNK 600
DB 541 LFLKESNSIAKPKVTLNSAALLQRYVRIRYASTTNLRLFVQNSNDFLVIYINKTMNK 599
QY 601 DDDLTYQTFDLATNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVOL 652
DB 601 DDDLTYQTFDLATNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVOL 651

RESULT 33
AA23183
ID AAY23183 standard; protein; 652 AA.
XX AC AAY23183;
XX DT 24-AUG-1999 (first entry)
XX DE Amino acid sequence of Cry3Bb.11232 polypeptide.
XX KW Cry3Bb; mutant; insecticidal activity; insecticidal specificity;

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KW coleoptera; southern corn rootworm; western corn root worm;
KW Diabrotica undecimpunctata howardi Barber; transgenic plant;
KW Diabrotica virgifera LeConte; insecticide resistance.
XX
OS Synthetic.
OS Bacillus thuringiensis.
XX
FN WO9931248-A1.
XX
PD 24-JUN-1999.
XX
PF 17-DEC-1998; 98WO-US026852.
XX
PR 18-DEC-1997; 97US-00993170.
PR 18-DEC-1997; 97US-00993722.
PR 18-DEC-1997; 97US-00993775.
PR 18-DEC-1997; 97US-00996441.
XX
XX (ECOG-) ECOGEN INC.
PA (MONS) MONSANTO CO.
XX
XX English L, Brussock SM, Malvar TM, Bryson JW, Kulesza CA;
PI Walters FS, Slatin SL, Von Tersch MA, Romano C;
XX
DR WPI; 1999-395184/33.
XX
XX Insecticidal Bacillus thuringiensis proteins.
PT
XX
PS Claim 39; Page 334-336; 512pp; English.
XX
XX AAY23172-Y23206, and AAY23208-X23209 represent new Bacillus thuringiensis
CC Cry3Bb mutant proteins. The specification also describes methods of
CC altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
CC polypeptide was modified to have improved insecticidal activity or
CC enhanced insecticidal specificity against a target insect. The
CC modification comprises at least one amino acid substitution, addition, or
CC deletion in the primary sequence of the native or unmodified Cry3Bb
CC polypeptide, wherein the substitution or deletion occurs at a position
CC corresponding to from about amino acids 1-365 of the unmodified
CC polypeptide sequence (AAY23207 represents the wild type Cry3Bb protein).
CC The polypeptide can be used to kill coleopteran pests, especially by
CC application to the environment. It is especially useful against southern
CC corn rootworm and western corn root worm, (Diabrotica undecimpunctata
CC howardi Barber, and Diabrotica virgifera LeConte respectively).
CC The mutant cry3Bb polynucleotides can also be used to produce transgenic
CC plants with increased insecticide resistance
XX
SQ Sequence 652 AA;
Query Match 99.4%; Score 3387; DB 2; Length 652;
Best Local Similarity 99.4%; Pred. No. 2.9e-275; Indels 0; Gaps 0;
Matches 648; Conservative 2; Mismatches 2;
QY 1 MNPENRSEHDTIKVTNSELQTNHNYPLADNPNTLSEELNYKEFLRMTEDSSTVELDNS 60
DB 1 MNPENRSEHDTIKVTNSELQTNHNYPLADNPNTLSEELNYKEFLRMTEDSSTVELDNS 60
QY 61 TVKDAVGTGISVVGQILGVGVFPAGALTSFYQSFLNTWPSDADPWKAPMAQVEVLIDK 120
DB 61 TVKDAVGTGISVVGQILGVGVFPAGALTSFYQSFLNTWPSDADPWKAPMAQVEVLIDK 120
QY 121 KIEEYAKSKALAEQLQNNFEDYNVALNSWKKTPLSLRKSRQDRIRELFSQAESHFRN 180
DB 121 KIEEYAKSKALAEQLQNNFEDYNVALNSWKKTPLSLRKSRQDRIRELFSQAESHFRN 180
QY 181 SMPFSAVSKFEVLFLPTYAQAANTHLLKLDQAQVGEWGYSSYSEDVAEFYHROKLKTOQY 240
DB 181 SMPFSAVSKFEVLFLPTYAQAANTHLLKLDQAQVGEWGYSSYSEDVAEFYHROKLKTOQY 240
QY 241 TDHCVMWYNGVGLRGSTVDWVKNRFRREMTLTVLDLVLFPFVDRLYSGVKTEL 300
DB 241 TDHCVMWYNGVGLRGSTVDWVKNRFRREMTLTVLDLVLFPFVDRLYSGVKTEL 300

QY 301 TRDIETDPIFSLNTLOEYGTFFLSIENIRKPHLFDYLOGIEFHTRLPQGVFGKDSFNW 360
DB 301 TRDIETDPIFPIPTLQDYGTFFLSIENIRKPHLFDYLOGIEFHTRLPQGVFGKDSFNW 360
QY 361 SGNVETRPSIGSSKTTITSPFYGDKSTPEVQKLSFDGQKVYRTIANTDVAAPNGKVYLG 420
DB 361 SGNVETRPSIGSSKTTITSPFYGDKSTPEVQKLSFDGQKVYRTIANTDVAAPNGKVYLG 420
QY 421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDOLPETTDEPLEKAYSHQLNVAE 480
DB 421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDOLPETTDEPLEKAYSHQLNVAE 480
QY 481 CFLMODRRGITPFTWTHRSVDFNTIDAETITQLPVVKAYALSSGASIIIEGPGFTGNNL 540
DB 481 CFLMODRRGITPFTWTHRSVDFNTIDAETITQLPVVKAYALSSGASIIIEGPGFTGNNL 540
QY 541 LFLKESNSIAKFKVTLNSAALLQRYVRIRYASTTNLRFLVQNSNDDFLVIYINKTMNK 600
DB 541 LFLKESNSIAKFKVTLNSAALLQRYVRIRYASTTNLRFLVQNSNDDFLVIYINKTMNK 600
QY 601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVOL 652
DB 601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVOL 652
RESULT 34
AAY23174
ID AAY23174 standard; protein; 652 AA.
XX
AC AAY23174;
XX
DT 24-AUG-1999 (first entry)
XX
DE Amino acid sequence of Cry3Bb.11223 polypeptide.
XX
KW Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
KW coleoptera; southern corn rootworm; western corn root worm;
KW Diabrotica undecimpunctata howardi Barber; transgenic plant;
KW Diabrotica virgifera LeConte; insecticide resistance.
XX
OS Synthetic.
OS Bacillus thuringiensis.
XX
PN WO9931248-A1.
XX
PD 24-JUN-1999.
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PF 17-DEC-1998; 98WO-US026852.
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PR 18-DEC-1997; 97US-00993170.
PR 18-DEC-1997; 97US-00993722.
PR 18-DEC-1997; 97US-00993775.
PR 18-DEC-1997; 97US-00996441.
XX
XX (ECOG-) ECOGEN INC.
PA (MONS) MONSANTO CO.
XX
PI English L, Brussock SM, Malvar TM, Bryson JW, Kulesza CA;
PI Walters FS, Slatin SL, Von Tersch MA, Romano C;
XX
XX WPI; 1999-395184/33.
XX
XX Insecticidal Bacillus thuringiensis proteins.
PS Claim 39; Page 283-285; 512pp; English.
XX
XX AAY23172-Y23206, and AAY23208-X23209 represent new Bacillus thuringiensis
CC Cry3Bb mutant proteins. The specification also describes methods of
CC altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
CC polypeptide was modified to have improved insecticidal activity or
CC enhanced insecticidal specificity against a target insect. The
CC modification comprises at least one amino acid substitution, addition, or
CC deletion in the primary sequence of the native or unmodified Cry3Bb
CC polypeptide, wherein the substitution or deletion occurs at a position
CC corresponding to from about amino acids 1-365 of the unmodified
CC polypeptide sequence (AAY23207 represents the wild type Cry3Bb protein).
CC The polypeptide can be used to kill coleopteran pests, especially by
CC application to the environment. It is especially useful against southern
CC corn rootworm and western corn root worm, (Diabrotica undecimpunctata
CC howardi Barber, and Diabrotica virgifera LeConte respectively).
CC The mutant cry3Bb polynucleotides can also be used to produce transgenic
CC plants with increased insecticide resistance
XX
SQ Sequence 652 AA;
Query Match 99.4%; Score 3387; DB 2; Length 652;
Best Local Similarity 99.4%; Pred. No. 2.9e-275; Indels 0; Gaps 0;
Matches 648; Conservative 2; Mismatches 2;
QY 1 MNPENRSEHDTIKVTNSELQTNHNYPLADNPNTLSEELNYKEFLRMTEDSSTVELDNS 60
DB 1 MNPENRSEHDTIKVTNSELQTNHNYPLADNPNTLSEELNYKEFLRMTEDSSTVELDNS 60
QY 61 TVKDAVGTGISVVGQILGVGVFPAGALTSFYQSFLNTWPSDADPWKAPMAQVEVLIDK 120
DB 61 TVKDAVGTGISVVGQILGVGVFPAGALTSFYQSFLNTWPSDADPWKAPMAQVEVLIDK 120
QY 121 KIEEYAKSKALAEQLQNNFEDYNVALNSWKKTPLSLRKSRQDRIRELFSQAESHFRN 180
DB 121 KIEEYAKSKALAEQLQNNFEDYNVALNSWKKTPLSLRKSRQDRIRELFSQAESHFRN 180
QY 181 SMPFSAVSKFEVLFLPTYAQAANTHLLKLDQAQVGEWGYSSYSEDVAEFYHROKLKTOQY 240
DB 181 SMPFSAVSKFEVLFLPTYAQAANTHLLKLDQAQVGEWGYSSYSEDVAEFYHROKLKTOQY 240
QY 241 TDHCVMWYNGVGLRGSTVDWVKNRFRREMTLTVLDLVLFPFVDRLYSGVKTEL 300
DB 241 TDHCVMWYNGVGLRGSTVDWVKNRFRREMTLTVLDLVLFPFVDRLYSGVKTEL 300

CC polypeptide, wherein the substitution or deletion occurs at a position
 CC corresponding to from about amino acids 1-365 of the unmodified
 CC polypeptide sequence (AAV23207 represents the wild type Cry3Bb protein).
 CC The polypeptide can be used to kill coleopteran pests, especially by
 CC application to the environment. It is especially useful against southern
 CC corn rootworm and western corn root worm, (Diabrotica undecimpunctata
 CC howardi Barber, and Diabrotica virgifera lecontei respectively).
 CC The mutant cry3Bb polynucleotides can also be used to produce transgenic
 CC plants with increased insecticide resistance
 XX
 SQ Sequence 652 AA;

Query Match 99.4%; Score 3386; DB 2; Length 652;
 Best Local Similarity 99.5%; Pred. No. 3.5e-275;
 Matches 649; Conservative 0; Mismatches 3; Indels 0; Gaps 0;

QY 1 MNPNNRSEHDTIKVTPNSELOTHNQYPLADNPSTLEELNYKEFLRMTESSSTEVLDS 60
 DB 1 MNPNNRSEHDTIKVTPNSELOTHNQYPLADNPSTLEELNYKEFLRMTESSSTEVLDS 60
 QY 61 TVKDVGVTGIVGVGQILGVVGVPPFAGALTSFYQSFLNTIWPSSDADPWKAFMAQVEVLIDK 120
 DB 61 TVKDVGVTGIVGVGQILGVVGVPPFAGALTSFYQSFLNTIWPSSDADPWKAFMAQVEVLIDK 120
 QY 121 KIEEYAKSKALAELOGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRLFSQAESHFRN 180
 DB 121 KIEEYAKSKALAELOGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRLFSQAESHFRN 180
 QY 181 SMPFSAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSDVAEFYHRLKLTQQY 240
 DB 181 SMPFSAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSDVAEFYHRLKLTQQY 240
 QY 241 TDHCVMNWNVGLNGRGSTYDAMVKNRFRREMTLTVDLILVFPFYDLRLYSKGVKTEL 300
 DB 241 TDHCVMNWNVGLNGRGSTYDAMVKNRFRREMTLTVDLILVFPFYDLRLYSKGVKTEL 300
 QY 301 TRDIFTDPIFSLNTLQEGYPTFLSIENSIRKPHLFDYLOQIEPHTRLQPGYFGKDSFNW 360
 DB 301 TRDIFTDPIFSLNTLQEGYPTFLSIENSIRKPHLFDYLOQIEPHTRLQPGYFGKDSFNW 360
 QY 361 SGNYVETRPSIGSKTITSFPYGDKSTPEVQKLSFGQKQVYRTIANTDVAAPNGKYL 420
 DB 361 SGNYVETRPSIGSKTITSFPYGDKSTPEVQKLSFGQKQVYRTIANTDVAAPNGKYL 420
 QY 421 VTKVDFSOYDDQNETSTQYDSKRNGHVSADSIDOLPPTTDPLEKAYSHQNLNAYE 480
 DB 421 VTKVDFSOYDDQNETSTQYDSKRNGHVSADSIDOLPPTTDPLEKAYSHQNLNAYE 480
 QY 481 CFLMQDRRGTPFPFTWTHRSVDFNTIDAETITQLPVKAYALSSGASIIIEGPGFTG 540
 DB 481 CFLMQDRRGTPFPFTWTHRSVDFNTIDAETITQLPVKAYALSSGASIIIEGPGFTG 540
 QY 541 LFLKESNSIAKPKVTLNSAALLQRYVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600
 DB 541 LFLKESNSIAKPKVTLNSAALLQRYVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600
 QY 601 DDLTQTQTFDLATNSNMGFGDKNELIIGAEFSVNEKIYIDKIFIPVQL 652
 DB 601 DDLTQTQTFDLATNSNMGFGDKNELIIGAEFSVNEKIYIDKIFIPVXL 652

RESULT 35

AAV23185

ID AAV23185 standard; protein; 652 AA.

XX

AC AAV23185;

XX

DT 24-AUG-1999 (first entry)

DE

XX Amino acid sequence of Cry3Bb.11234 polypeptide.

XX

KW Cry3Bb; mutant; insecticidal activity; insecticidal specificity;

KW coleoptera; southern corn rootworm; western corn root worm;

KW Diabrotica undecimpunctata howardi Barber; transgenic plant;
 KW Diabrotica virgifera lecontei; insecticide resistance.

XX Synthetic.

OS Bacillus thuringiensis.

XX WO9931248-A1.

PN 24-JUN-1999.

XX

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|||||
301 TRDIFTDFSLNTLQEVGPTFLSIENSRKPHLFDYLQIGIEFHTRLQPGYFGKDSFNYW 360
QY 361 SGNVETRPISGSSKTIITSPFFGDKSTPEVQKLSFDGQKQVYRTIANTDVAAPNGKVYL 420
Db 361 SGNVETRPISGSSKTIITSPFFGDKSTPEVQKLSFDGQKQVYRTIANTDVAAPNGKVYL 420
QY 421 VTKVDFSOYDDQKNETSTQYDSKRNNGHVSAQDSIDQLPPTTDEPLEKAYSHQINVAE 480
Db 421 VTKVDFSOYDDQKNETSTQYDSKRNNGHVSAQDSIDQLPPTTDEPLEKAYSHQINVAE 480
QY 481 CFLMQDRRGCTIPFTTWTHTSRVDFNTIDAETKITQLPVVKAYALSSGASIIIEGPGFTGGNL 540
Db 481 CFLMQDRRGCTIPFTTWTHTSRVDFNTIDAETKITQLPVVKAYALSSGASIIIEGPGFTGGNL 540
QY 541 LFLKSSNSIAKFKVTLNSAALLQRYRIRYASTTNLRLFVQNSNDFLVIYINKTMNK 600
Db 541 LFLKSSNSIAKFKVTLNSAALLQRYRIRYASTTNLRLFVQNSNDFLVIYINKTMNK 600
QY 601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNKEIYIDKIEFIPVQL 652
Db 601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNKEIYIDKIEFIPVQL 652

RESULT 36
AAV23194
ID AAY23194 standard; protein; 652 AA.
AC AAY23194;
XX
DT 24-AUG-1999 (first entry)
XX
DE Amino acid sequence of Cry3Bb.11035 polypeptide.
XX
KW Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
KW coleoptera; southern corn rootworm; western corn root worm;
KW Diabrotica undecimpunctata howardi Barber; transgenic plant;
KW Diabrotica virgifera vergifera LeConte; insecticide resistance.

OS Synthetic.
OS Bacillus thuringiensis.
XX WO9931248-A1.
XX
PD 24-JUN-1999.
XX
PF 17-DEC-1998; 98WO-US026852.
XX
PR 18-DEC-1997; 97US-00993170.
PR 18-DEC-1997; 97US-00993722.
PR 18-DEC-1997; 97US-00993775.
PR 18-DEC-1997; 97US-00996441.
XX
PA (ECOG-) ECOGEN INC.
PA (MONS) MONSANTO CO.
XX
PI English L, Brussock SM, Malvar TM, Bryson JW, Kulesza CA;
PI Walters FS, Slatin SL, von Tersch MA, Romano C;
XX WPI; 1999-395184/33.

Insecticidal Bacillus thuringiensis proteins.
XX
PS Claim 39; Page 396-398; 512pp; English.
XX
CC AAY231172-Y23206, and AAX23208-X23209 represent new Bacillus thuringiensis
CC Cry3Bb mutant proteins. The specification also describes methods of
CC altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
CC polypeptide was modified to have improved insecticidal activity or
CC enhanced insecticidal specificity against a target insect. The
CC modification comprises at least one amino acid substitution, addition, or
CC deletion in the primary sequence of the native or unmodified Cry3Bb
CC polypeptide, wherein the substitution or deletion occurs at a position

CC corresponding to from about amino acids 1-365 of the unmodified
CC polypeptide sequence (AAY23207 represents the wild type Cry3Bb protein).
CC The polypeptide can be used to kill coleopteran pests, especially by
CC application to the environment. It is especially useful against southern
CC corn rootworm and western corn root worm, (Diabrotica undecimpunctata
CC howardi Barber, and Diabrotica virgifera vergifera LeConte respectively).
CC The mutant cry3Bb polynucleotides can also be used to produce transgenic
CC plants with increased insecticide resistance
XX
SQ Sequence 652 AA;

Query Match 99.4%; Score 3385; DB 2; Length 652;
Best Local Similarity 99.4%; Pred. No. 4.3e-275;
Matches 648; Conservative 1; Mismatches 3; Indels 0; Gaps 0;

QY 1 MNPNNRSEHDITKVTPNSELQTNHNYPLADNPSTLEELNYKEFLRMTEDSSTVLDNS 60
Db 1 MNPNNRSEHDITKVTPNSELQTNHNYPLADNPSTLEELNYKEFLRMTEDSSTVLDNS 60
QY 61 TVKDAVGTVGVGQILGVGVPPAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120
Db 61 TVKDAVGTVGVGQILGVGVPPAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120
QY 121 KIEEYAKSKALAEQLQGNFEDYVNALNSWKKTPLSLRKRSDRIRELFSQAESHFRN 180
Db 121 KIEEYAKSKALAEQLQGNFEDYVNALNSWKKTPLSLRKRSDRIRELFSQAESHFRN 180
QY 181 SMPSPAVSKPEVLFLPTYAQAANTHLLLLKDAQVFGEGWYSSSEDAVFYRHQLKLTQOY 240
Db 181 SMPSPAVSKPEVLFLPTYAQAANTHLLLLKDAQVFGEGWYSSSEDAVFYRHQLKLTQOY 240
QY 241 TDHCVNWNVNLGLRGSTYDAWKVFNFRREMTLVLDLVLFPFYDIRLYSKGVKTEL 300
Db 241 TDHCVNWNVNLGLRGSTYDAWKVFNFRREMTLVLDLVLFPFYDIRLYSKGVKTEL 300
QY 301 TRDIFTDFISLNTLQEVGPTFLSIENSRKPHLFDYLQIGIEFHTRLQPGYFGKDSFNYW 360
Db 301 TRDIFTDFISLNTLQEVGPTFLSIENSRKPHLFDYLQIGIEFHTRLQPGYFGKDSFNYW 360
QY 361 SGNVETRPISGSSKTIITSPFFGDKSTPEVQKLSFDGQKQVYRTIANTDVAAPNGKVYL 420
Db 361 SGNVETRPISGSSKTIITSPFFGDKSTPEVQKLSFDGQKQVYRTIANTDVAAPNGKVYL 420
QY 421 VTKVDFSOYDDQKNETSTQYDSKRNNGHVSAQDSIDQLPPTTDEPLEKAYSHQINVAE 480
Db 421 VTKVDFSOYDDQKNETSTQYDSKRNNGHVSAQDSIDQLPPTTDEPLEKAYSHQINVAE 480
QY 481 CFLMQDRRGCTIPFTTWTHTSRVDFNTIDAETKITQLPVVKAYALSSGASIIIEGPGFTGGNL 540
Db 481 CFLMQDRRGCTIPFTTWTHTSRVDFNTIDAETKITQLPVVKAYALSSGASIIIEGPGFTGGNL 540
QY 541 LFLKSSNSIAKFKVTLNSAALLQRYRIRYASTTNLRLFVQNSNDFLVIYINKTMNK 600
Db 541 LFLKSSNSIAKFKVTLNSAALLQRYRIRYASTTNLRLFVQNSNDFLVIYINKTMNK 600
QY 601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNKEIYIDKIEFIPVQL 652
Db 601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNKEIYIDKIEFIPVQL 652

RESULT 37
AAV23182
ID AAY23182 standard; protein; 652 AA.
XX
AC AAY23182;
XX
DT 24-AUG-1999 (first entry)
XX
DE Amino acid sequence of Cry3Bb.11231 polypeptide.
XX Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
KW coleoptera; southern corn rootworm; western corn root worm;
KW Diabrotica undecimpunctata howardi Barber; transgenic plant;

KW Diabrotica virgifera vergifera LeConte; insecticide resistance.
 XX
 OS Synthetic.
 OS Bacillus thuringiensis.
 XX
 PN WO9931248-A1.
 XX
 XX 24-JUN-1999.
 XX
 XX 17-DEC-1998; 98WO-US026852.
 XX
 PR 18-DEC-1997; 97US-00993170.
 PR 18-DEC-1997; 97US-00993722.
 PR 18-DEC-1997; 97US-00993775.
 PR 18-DEC-1997; 97US-00996441.
 XX
 XX (ECOG-) ECOGEN INC.
 PA (MONS) MONSANTO CO.
 XX
 XX English L, Brusseck SM, Malvar TM, Bryson JW, Kulesza CA;
 PI Walters FS, Slatin SL, Von Tersch MA, Romano C;
 XX
 DR WPI; 1999-395184/33.
 XX
 PT Insecticidal Bacillus thuringiensis proteins.
 XX
 PS Claim 39; Page 328-330; 512pp; English.
 XX
 CC AAY23172-Y23206, and AAY23208-X23209 represent new Bacillus thuringiensis
 CC Cry3Bb mutant proteins. The specification also describes methods of
 CC altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
 CC polypeptide was modified to have improved insecticidal activity or
 CC enhanced insecticidal specificity against a target insect. The
 CC modification comprises at least one amino acid substitution, addition, or
 CC deletion in the primary sequence of the native or unmodified Cry3Bb
 CC polypeptide, wherein the substitution or deletion occurs at a position
 CC corresponding to from about amino acids 1-365 of the unmodified
 CC polypeptide sequence (AAY23207 represents the wild type Cry3Bb protein).
 CC The polypeptide can be used to kill coleopteran pests, especially by
 CC application to the environment. It is especially useful against southern
 CC corn rootworm and western corn rootworm, (Diabrotica undecimpunctata
 CC howardi Barber, and Diabrotica virgifera vergifera LeConte respectively).
 CC The mutant cry3Bb polynucleotides can also be used to produce transgenic
 CC plants with increased insecticide resistance
 XX
 SQ Sequence 652 AA;
 Query Match 99.3%; Score 3382; DB 2; Length 652;
 Best Local Similarity 99.4%; Pred. No. 7.7e-275;
 Matches 648; Conservative 1; Mismatches 3; Indels 0; Gaps 0;
 QY 1 MNPNNRSEHDTIKVTNSELQTHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDS 60
 DB 1 MNPNNRSEHDTIKVTNSELQTHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDS 60
 QY 61 TVKDAGVTGIVGVQILGVGVFPFAGALTSFYOSFLNTTWPSDADPWKAFMAQVEVLIDK 120
 DB 61 TVKDAGVTGIVGVQILGVGVFPFAGALTSFYOSFLNTTWPSDADPWKAFMAQVEVLIDK 120
 QY 121 KIEEYAKSKALAEQLQNNFNEDYVNALNSWKKTPLSLRSKRSQDRIRLFSQAESHFRN 180
 DB 121 KIEEYAKSKALAEQLQNNFNEDYVNALNSWKKTPLSLRSKRSQDRIRLFSQAESHFRN 180
 QY 181 SMPFSAVSKFEVLFLPTYAQAAHTHLLLLKDAQVGEWGYSSYEDVAEPYHRLQKLTOQY 240
 DB 181 SMPFSAVSKFEVLFLPTYAQAAHTHLLLLKDAQVGEWGYSSYEDVAEPYHRLQKLTOQY 240
 QY 241 TDHCVMNVNGLNGLRGTYDAWKFNRRFRETMTLVLDLIVLFPFYDRLXSKGVKTEL 300
 DB 241 TDHCVMNVNGLNGLRGTYDAWKFNRRFRETMTLVLDLIVLFPFYDRLXSKGVKTEL 300
 QY 301 TRDIFTDPIFSLTQEGYPTFLSIENSIKPKHLFDYLOQIEPHTRLQPCYFGKDSFNW 360
 DB 301 TRDIFTDPIFSLTQEGYPTFLSIENSIKPKHLFDYLOQIEPHTRLQPCYFGKDSFNW 360

Db 301 TRDIFTDPIFSLTQEGYPTFLSIENSIKPKHLFDYLOQIEPHTRLQPCYFGKDSFNW 360
 QY 361 SGNVETREPSIGSSKTTITSPFYGDKSTEPVOKLSFDGQKVYRTIANTDVAAWNGKVYLG 420
 Db 361 SGNVETREPSIGSSKTTITSPFYGDKSTEPVOKLSFDGQKVYRTIANTDVAAWNGKVYLG 420
 QY 421 VTKVDFSQDDQKNETSTQYDSKRNNGHVSAQDSIDQLPPETTDPELEKAYSHQLNYAE 480
 Db 421 VTKVDFSQDDQKNETSTQYDSKRNNGHVSAQDSIDQLPPETTDPELEKAYSHQLNYAE 480
 QY 481 CFQMQRRTIIPFTWTHRSVDFNTIDAEKITQLPVPVKAYALSSGASIEGPGFTGNNL 540
 Db 481 CFQMQRRTIIPFTWTHRSVDFNTIDAEKITQLPVPVKAYALSSGASIEGPGFTGNNL 540
 QY 541 LFLKSSNSIAKPKVTLNSAALLQRYRVRIRVASTTNLRLFVQNSNNDLVIYINKTMNK 600
 Db 541 LFLKSSNSIAKPKVTLNSAALLQRYRVRIRVASTTNLRLFVQNSNNDLVIYINKTMNK 600
 QY 601 DDDLTQYQTFDLATTNSNMGFGDKNELIIGAESFVSNKIIYIDKIEFIPVOL 652
 Db 601 DDDLTQYQTFDLATTNSNMGFGDKNELIIGAESFVSNKIIYIDKIEFIPVOL 652

RESULT 38
 AAY23190
 ID AAY23190 standard; protein; 652 AA.
 XX
 AC AAY23190;
 XX
 DT 24-AUG-1999 (first entry)
 XX
 DE Amino acid sequence of Cry3Bb.11239 polypeptide.
 XX
 KW Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
 KW coleoptera; southern corn rootworm; western corn root worm;
 KW Diabrotica undecimpunctata howardi Barber; transgenic plant;
 KW Diabrotica virgifera vergifera LeConte; insecticide resistance.
 XX
 OS Synthetic.
 OS Bacillus thuringiensis.
 XX
 PN WO9931248-A1.
 XX
 PD 24-JUN-1999.
 XX
 PF 17-DEC-1998; 98WO-US026852.
 XX
 PR 18-DEC-1997; 97US-00993170.
 PR 18-DEC-1997; 97US-00993722.
 PR 18-DEC-1997; 97US-00993775.
 PR 18-DEC-1997; 97US-00996441.
 XX
 XX (ECOG-) ECOGEN INC.
 PA (MONS) MONSANTO CO.
 XX
 XX English L, Brusseck SM, Malvar TM, Bryson JW, Kulesza CA;
 PI Walters FS, Slatin SL, Von Tersch MA, Romano C;
 XX
 DR WPI; 1999-395184/33.
 XX
 PT Insecticidal Bacillus thuringiensis proteins.
 XX
 PS Claim 39; Page 373-375; 512pp; English.
 XX
 CC AAY23172-Y23206, and AAY23208-X23209 represent new Bacillus thuringiensis
 CC Cry3Bb mutant proteins. The specification also describes methods of
 CC altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
 CC polypeptide was modified to have improved insecticidal activity or
 CC enhanced insecticidal specificity against a target insect. The
 CC modification comprises at least one amino acid substitution, addition, or
 CC deletion in the primary sequence of the native or unmodified Cry3Bb
 CC polypeptide, wherein the substitution or deletion occurs at a position
 CC corresponding to from about amino acids 1-365 of the unmodified
 CC polypeptide, wherein the substitution or deletion occurs at a position
 CC corresponding to from about amino acids 1-365 of the unmodified
 CC

CC polypeptide sequence (AAV23207 represents the wild type Cry3Bb protein).
CC The polypeptide can be used to kill coleopteran pests, especially by
CC application to the environment. It is especially useful against southern
CC corn rootworm and western corn root worm, (Diabrotica undecimpunctata
CC howardi Barber, and Diabrotica virgifera LeConte respectively).
CC The mutant cry3Bb polynucleotides can also be used to produce transgenic
CC plants with increased insecticide resistance
XX
SQ Sequence 652 AA;

Query Match 99.2%; Score 3380; DB 2; Length 652;
Best Local Similarity 99.4%; Pred. No. 1.1e-274;
Matches 648; Conservative 0; Mismatches 4; Indels 0; Gaps 0;
QY 1 MNPNNRSEHDTIKVTPNSELOTHNQYPLADNPSTLEELNYKEFLRMTEDSSTEVLDS 60
Db 1 MNPNNRSEHDTIKVTPNSELOTHNQYPLADNPSTLEELNYKEFLRMTEDSSTEVLDS 60
QY 61 TVKDVGVTGISVVGQILGVGVFPAGALTSTFYQSFLNTIWPSPDADPKAFMAQVEVLIDK 120
Db 61 TVKDVGVTGISVVGQILGVGVFPAGALTSTFYQSFLNTIWPSPDADPKAFMAQVEVLIDK 120
QY 121 KIEEYAKSKALAELOGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRFLFQAESHFRN 180
Db 121 KIEEYAKSKALAELOGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRFLFQAESHFRN 180
QY 181 SMPSPAVSKFEVLFLPTYAQAANTHLLKDAQVGEENGYSSEDAEFYHRLKLTQOY 240
Db 181 SMPSPAVSKFEVLFLPTYAQAANTHLLKDAQVGEENGYSSEDAEFYHRLKLTQOY 240
QY 241 TDHCNVNMYNGLNGRSTYDAWVKFNRRREMTLTVDLILVLPFYDIRLYSKGVKTEL 300
Db 241 TDHCNVNMYNGLNGRSTYDAWVKFNRRREMTLTVDLILVLPFYDIRLYSKGVKTEL 300
QY 301 TRDIFTDPIFSLNTLOEQYGTFLSIENSIRKPHLFDYLGQIEFHTRLOPGYFGKDSFNW 360
Db 301 TRDIFTDPIFSLRTPLAYGPTFLSIENSIRKPHLFDYLGQIEFHTRLOPGYFGKDSFNW 360
QY 361 SGNVETRPSIGSKTITSPFYGDKSTEPVKLSFGQKVYRTIANTDVAAMPNGKVILG 420
Db 361 SGNVETRPSIGSKTITSPFYGDKSTEPVKLSFGQKVYRTIANTDVAAMPNGKVILG 420
QY 421 VTKVDFSOYDDQKNETSTQYDSKRNNGHVSQAQSDIDQLPPTTDEPLEKAYSHQINAE 480
Db 421 VTKVDFSOYDDQKNETSTQYDSKRNNGHVSQAQSDIDQLPPTTDEPLEKAYSHQINAE 480
QY 481 CFLMDRRGTIPFTWTHRSVDFFNTIDAETITQLPVVKAYALSSGASIIIEGPGTGNL 540
Db 481 CFLMDRRGTIPFTWTHRSVDFFNTIDAETITQLPVVKAYALSSGASIIIEGPGTGNL 540
QY 541 LFLKSSNSIAKPKVTLSAALLQYRVIRVASTTNLRLFVQNSNNDPLVIYINKTNK 600
Db 541 LFLKSSNSIAKPKVTLSAALLQYRVIRVASTTNLRLFVQNSNNDPLVIYINKTNK 600
QY 601 DDDLTQTQFDLATTNSMGFSGDKNELIIIGAESFVSNEKIYIDKIEFIPVQL 652
Db 601 DDDLTQTQFDLATTNSMGFSGDKNELIIIGAESFVSNEKIYIDKIEFIPVQL 652

RESULT 39
AAV23189
ID AAV23189 standard; protein; 652 AA.
XX
AC AAV23189;
XX
DT 24-AUG-1999 (first entry)
XX
DE Amino acid sequence of Cry3Bb.11238 polypeptide.
XX
KW Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
KW coleoptera; southern corn rootworm; western corn root worm;
KW Diabrotica undecimpunctata howardi Barber; transgenic plant;
KW Diabrotica virgifera LeConte; insecticide resistance.

XX
OS Synthetic.
OS Bacillus thuringiensis.
XX
PN WO9931248-A1.
XX
PD 24-JUN-1999.
XX
PF 17-DEC-1998; 98WO-US026852.
XX
PR 18-DEC-1997; 97US-009931170.
PR 18-DEC-1997; 97US-00993722.
PR 18-DEC-1997; 97US-00993775.
PR 18-DEC-1997; 97US-00996441.
XX
PA (ECOG-) ECOGEN INC.
PA (MONS) MONSANTO CO.
XX
PI English L, Brussock SM, Malvar TM, Bryson JW, Kulesza CA;
PI Walters FS, Slatin SL, Von Tersch MA, Romano C;
XX
DR WPI; 1999-395184/33.
XX
PT Insecticidal Bacillus thuringiensis proteins.
PS
PS Claim 39; Page 367-370; 512pp; English.
XX
CC AAV23172-Y23206, and AAX23208-X23209 represent new Bacillus thuringiensis
CC Cry3Bb mutant proteins. The specification also describes methods of
CC altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
CC polypeptide was modified to have improved insecticidal activity or
CC enhanced insecticidal specificity against a target insect. The
CC modification comprises at least one amino acid substitution, addition, or
CC deletion in the primary sequence of the native or unmodified Cry3Bb
CC polypeptide, wherein the substitution or deletion occurs at a position
CC corresponding to from amino acids 1-365 of the unmodified
CC polypeptide sequence (AAV23207 represents the wild type Cry3Bb protein).
CC The polypeptide can be used to kill coleopteran pests, especially by
CC application to the environment. It is especially useful against southern
CC corn rootworm and western corn root worm, (Diabrotica undecimpunctata
CC howardi Barber, and Diabrotica virgifera LeConte respectively).
CC The mutant cry3Bb polynucleotides can also be used to produce transgenic
CC plants with increased insecticide resistance
XX
SQ Sequence 652 AA;

Query Match 99.2%; Score 3380; DB 2; Length 652;
Best Local Similarity 99.4%; Pred. No. 1.1e-274;
Matches 648; Conservative 0; Mismatches 4; Indels 0; Gaps 0;
QY 1 MNPNNRSEHDTIKVTPNSELOTHNQYPLADNPSTLEELNYKEFLRMTEDSSTEVLDS 60
Db 1 MNPNNRSEHDTIKVTPNSELOTHNQYPLADNPSTLEELNYKEFLRMTEDSSTEVLDS 60
QY 61 TVKDVGVTGISVVGQILGVGVFPAGALTSTFYQSFLNTIWPSPDADPKAFMAQVEVLIDK 120
Db 61 TVKDVGVTGISVVGQILGVGVFPAGALTSTFYQSFLNTIWPSPDADPKAFMAQVEVLIDK 120
QY 121 KIEEYAKSKALAELOGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRFLFQAESHFRN 180
Db 121 KIEEYAKSKALAELOGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRFLFQAESHFRN 180
QY 181 SMPSPAVSKFEVLFLPTYAQAANTHLLKDAQVGEENGYSSEDAEFYHRLKLTQOY 240
Db 181 SMPSPAVSKFEVLFLPTYAQAANTHLLKDAQVGEENGYSSEDAEFYHRLKLTQOY 240
QY 241 TDHCNVNMYNGLNGRSTYDAWVKFNRRREMTLTVDLILVLPFYDIRLYSKGVKTEL 300
Db 241 TDHCNVNMYNGLNGRSTYDAWVKFNRRREMTLTVDLILVLPFYDIRLYSKGVKTEL 300
QY 301 TRDIFTDPIFSLNTLOEQYGTFLSIENSIRKPHLFDYLGQIEFHTRLOPGYFGKDSFNW 360
Db 301 TRDIFTDPIFSLNLMVYGPFLSIENSIRKPHLFDYLGQIEFHTRLOPGYFGKDSFNW 360

QY 361 SGNVETRPISGSKTITSPFYGDKSTPEVQKLSFDGQKVYRTIANTDVAWPNKGKYL 420
 DB 361 SGNVETRPISGSKTITSPFYGDKSTPEVQKLSFDGQKVYRTIANTDVAWPNKGKYL 420
 QY 421 VTKVDFSYDDQKNETSTQYDSKRNHGVSAQDSIDQLPPTTDEPLEKAYSHQNL 480
 DB 421 VTKVDFSYDDQKNETSTQYDSKRNHGVSAQDSIDQLPPTTDEPLEKAYSHQNL 480
 QY 481 CFLMDRRGTIPFTTWTTHRSVDFNTDAEKITQLPVKAYALSSGASIIIEGPGFTG 540
 DB 481 CFLMDRRGTIPFTTWTTHRSVDFNTDAEKITQLPVKAYALSSGASIIIEGPGFTG 540
 QY 541 LFLKSSNSIAKFKVTLNSAALLQRYVRIRYASTTNLRLFVQNSNNDFLVIYINKTM 600
 DB 541 LFLKSSNSIAKFKVTLNSAALLQRYVRIRYASTTNLRLFVQNSNNDFLVIYINKTM 600
 QY 601 DDLTYQTFLATTNSNMFGSGDKNELIIGAESFVSNKEIYIDKIEFIPVQL 652
 DB 601 DDLTYQTFLATTNSNMFGSGDKNELIIGAESFVSNKEIYIDKIEFIPVQL 652
 RESULT 40
 ID AAY23196
 XX AAY23196 standard; protein; 652 AA.
 AC AAY23196;
 XX
 DT 24-AUG-1999 (first entry)
 XX
 DE Amino acid sequence of Cry3Bb.11046 polypeptide.
 XX
 KW Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
 KW coleoptera; southern corn rootworm; western corn root worm;
 KW Diabrotica undecimpunctata howardi Barber; transgenic plant;
 KW Diabrotica virgifera verigifera LeConte; insecticide resistance.
 XX
 OS Synthetic.
 OS Bacillus thuringiensis.
 XX
 XX WO9931248-A1.
 XX
 XX 24-JUN-1999.
 XX
 XX 17-DEC-1998; 98WO-US026852.
 XX
 PR 18-DEC-1997; 97US-00993170.
 PR 18-DEC-1997; 97US-00993722.
 PR 18-DEC-1997; 97US-00993775.
 PR 18-DEC-1997; 97US-00996441.
 XX
 PA (ECOG-) ECOGEN INC.
 PA (MONS) MONSANTO CO.
 XX
 XX English L, Brussock SM, Malvar TM, Bryson JW, Kulesza CA;
 PI Walters FS, Slaton SL, Von Terach MA, Romano C;
 XX
 XX WPI; 1999-395184/33.
 XX
 PT Insecticidal Bacillus thuringiensis proteins.
 XX
 PS Claim 39; Page 407-409; 512pp; English.
 XX
 CC AAY23172-Y23206, and AAY23208-X23209 represent new Bacillus thuringiensis
 CC Cry3Bb mutant proteins. The specification also describes methods of
 CC altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
 CC polypeptide was modified to have improved insecticidal activity or
 CC enhanced insecticidal specificity against a target insect. The
 CC modification comprises at least one amino acid substitution, addition, or
 CC deletion in the primary sequence of the native or unmodified Cry3Bb
 CC polypeptide, wherein the substitution or deletion occurs at a position
 CC corresponding to from about amino acids 1-365 of the unmodified
 CC polypeptide sequence (AAY23207 represents the wild type Cry3Bb protein).

CC The polypeptide can be used to kill coleopteran pests, especially by
 CC application to the environment. It is especially useful against southern
 CC corn rootworm and western corn root worm, (Diabrotica undecimpunctata
 CC howardi Barber, and Diabrotica virgifera verigifera LeConte respectively).
 CC The mutant cry3Bb polynucleotides can also be used to produce transgenic
 CC plants with increased insecticide resistance
 XX
 SQ Sequence 652 AA;
 Query Match 99.2%; Score 3379; DB 2; Length 652;
 Best Local Similarity 99.1%; Pred. No. 1.4e-274;
 Matches 646; Conservative 2; Mismatches 4; Indels 0; Gaps 0;
 QY 1 MNPNNRSEHDTTKVTNSLQTNHNOYPLADNPSTLEELNYKEFLRMTESSSTEVL 60
 DB 1 MNPNNRSEHDTTKVTNSLQTNHNOYPLADNPSTLEELNYKEFLRMTESSSTEVL 60
 QY 61 TVKDAVGTGIVGVVQILGVVGVVFPAGALTSTFYQSFLNTIWPSPDADPWKAFMAQVEVL 120
 DB 61 TVKDAVGTGIVGVVQILGVVGVVFPAGALTSTFYQSFLNTIWPSPDADPWKAFMAQVEVL 120
 QY 121 KIEEYAKSKALAELOGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRLFSAESHFRN 180
 DB 121 KIEEYAKSKALAELOGLQNNFEDYVNALNSWKKTPLSLRNPHSQDRIRLFSAESHFRN 180
 QY 181 SMPSPAVSKFEVLFLPTYAQAANTHLLKDAQVFGEEGWYSSDVAEFVHRQLKLTQ 240
 DB 181 SMPSPAVSKFEVLFLPTYAQAANTHLLKDAQVFGEEGWYSSDVAEFVHRQLKLTQ 240
 QY 241 TDHCNVNWNVGLNGLRGSTYDAWVKNFRPREMTLTVDLVLFPFYDRLYSKGVKTEL 300
 DB 241 TDHCNVNWNVGLNGLRGSTYDAWVKNFRPREMTLTVDLVLFPFYDRLYSKGVKTEL 300
 QY 301 TRDIFTDPIFSLNTLQEGYPTFLSLSTENSRKPHLPDYLOGIEPHTLQPGYFGKDSFNY 360
 DB 301 TRDIFTDPIFSLNTLQEGYPTFLSLSTENSRKPHLPDYLOGIEPHTLQPGYFGKDSFNY 360
 QY 361 SGNVETRPISGSKTITSPFYGDKSTPEVQKLSFDGQKVYRTIANTDVAWPNKGKYL 420
 DB 361 SGNVETRPISGSKTITSPFYGDKSTPEVQKLSFDGQKVYRTIANTDVAWPNKGKYL 420
 QY 421 VTKVDFSYDDQKNETSTQYDSKRNHGVSAQDSIDQLPPTTDEPLEKAYSHQNL 480
 DB 421 VTKVDFSYDDQKNETSTQYDSKRNHGVSAQDSIDQLPPTTDEPLEKAYSHQNL 480
 QY 481 CFLMDRRGTIPFTTWTTHRSVDFNTDAEKITQLPVKAYALSSGASIIIEGPGFTG 540
 DB 481 CFLMDRRGTIPFTTWTTHRSVDFNTDAEKITQLPVKAYALSSGASIIIEGPGFTG 540
 QY 541 LFLKSSNSIAKFKVTLNSAALLQRYVRIRYASTTNLRLFVQNSNNDFLVIYINKTM 600
 DB 541 LFLKSSNSIAKFKVTLNSAALLQRYVRIRYASTTNLRLFVQNSNNDFLVIYINKTM 600
 QY 601 DDLTYQTFLATTNSNMFGSGDKNELIIGAESFVSNKEIYIDKIEFIPVQL 652
 DB 601 DDLTYQTFLATTNSNMFGSGDKNELIIGAESFVSNKEIYIDKIEFIPVQL 652
 RESULT 41
 ID AAY23172
 XX AAY23172 standard; protein; 652 AA.
 AC AAY23172;
 XX
 DT 24-AUG-1999 (first entry)
 XX
 DE Amino acid sequence of Cry3Bb.11221 polypeptide.
 KW Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
 KW coleoptera; southern corn rootworm; western corn root worm;
 KW Diabrotica undecimpunctata howardi Barber; transgenic plant;
 KW Diabrotica virgifera verigifera LeConte; insecticide resistance.
 XX

```
OS Synthetic.
OS Bacillus thuringiensis.
XX WO9931248-A1.
PN
XX
XX
XX 24-JUN-1999.
XX
XX 17-DEC-1998; 98WO-US026852.
XX
XX 18-DEC-1997; 97US-00993170.
PR 18-DEC-1997; 97US-00993722.
PR 18-DEC-1997; 97US-00993775.
PR 18-DEC-1997; 97US-00996441.
XX
XX (ECOG-) ECOGEN INC.
PA (MONS ) MONSANTO CO.
XX
XX English L, Brussock SM, Malvar TM, Bryson JW, Kulesza CA;
PI Walters FS, Slatin SL, Von Tersch MA, Romano C;
XX
XX WPI; 1999-395184/33.
XX
XX Insecticidal Bacillus thuringiensis proteins.
PT
XX
XX Claim 39; Page 272-274; 512pp; English.
XX
XX AAY23172-Y23206, and AAY23208-X23209 represent new Bacillus thuringiensis
CC Cry3Bb mutant proteins. The specification also describes methods of
CC altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
CC polypeptide was modified to have improved insecticidal activity or
CC enhanced insecticidal specificity against a target insect. The
CC modification comprises at least one amino acid substitution, addition, or
CC deletion in the primary sequence of the native or unmodified Cry3Bb
CC polypeptide, wherein the substitution or deletion occurs at a position
CC corresponding to from about amino acids 1-365 of the unmodified
CC polypeptide sequence (AAY23207 represents the wild type Cry3Bb protein).
CC The polypeptide can be used to kill coleopteran pests, especially by
CC application to the environment. It is especially useful against southern
CC corn rootworm and western corn root worm, (Diabrotica undecimpunctata
CC howardi Barber, and Diabrotica virgifera virgifera LeConte respectively).
CC The mutant cry3Bb polynucleotides can also be used to produce transgenic
CC plants with increased insecticide resistance
XX
XX Sequence 652 AA;
SQ
Query Match 99.1%; Score 3377; DB 2; Length 652;
Best Local Similarity 99.4%; Pred. No. 28-274;
Matches 648; Conservative 0; Mismatches 4; Indels 0; Gaps 0;
QY 1 MNPNNRSEHDTIKVTPNSELOTHNQYPLADNPSTLEELNYKEFLRMTEDSSTVLDSN 60
DB 1 MNPNNRSEHDTIKVTPNSELOTHNQYPLADNPSTLEELNYKEFLRMTEDSSTVLDSN 60
QY 61 TVKDVGTSISVVGQILGVGVFPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120
DB 61 TVKDVGTSISVVGQILGVGVFPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120
QY 121 KIEEYAKSKALAELOGLQNNFEDYNALNSWKKTPLSLRSKRSQDRIRIELFSQAESHFRN 180
DB 121 KIEEYAKSKALAELOGLQNNFEDYNALNSWKKTPLSLRSKRSQDRIRIELFSQAESHFRN 180
QY 181 SMPSPAVSKFEVLFPTTAAQANTHLLLLKDAQVFGEEWGSSEDDVAEFYHRLKLTQY 240
DB 181 SMPSPAVSKFEVLFPTTAAQANTHLLLLKDAQVFGEEWGSSEDDVAEFYHRLKLTQY 240
QY 241 TDHCNWNVNGLNGRSGTYDAWKFNFRFRMTLTVLDLIVLFPFFDIRLYSKGVKTEL 300
DB 241 TDHCNWNVNGLNGRSGTYDAWKFNFRFRMTLTVLDLIVLFPFFDIRLYSKGVKTEL 300
QY 301 TRDIFTDPTFSLNTLQEVGPTFLSIENSIRKPHLFDYLQGIETFRLOPGVFGKDSFNW 360
DB 301 TRDIFTDPTFSLNTLQEVGPTFLSIENSIRKPHLFDYLQGIETFRLOPGVFGKDSFNW 360
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QY 361 SGNVYETRPSIGSSKTIITSPFYGDKSTBPVKQLSFDGQKVYRTIANTDVAAMPNGKVYLG 420
DB |||||
QY 361 SGNVYETRPSIGSSKTIITSPFYGDKSTBPVKQLSFDGQKVYRTIANTDVAAMPNGKVYLG 420
DB |||||
QY 421 VTKVDFSOYDDOKNETSTQTYDSKENNGHVSAQSDIDQLPPETTDEPLEKAYSHQNLVAE 480
DB |||||
QY 421 VTKVDFSOYDDOKNETSTQTYDSKENNGHVSAQSDIDQLPPETTDEPLEKAYSHQNLVAE 480
DB |||||
QY 481 CFLMODRRGTIPFFTWTHRSVDFFNTIDAETITQLPVVKAYALSSGASIIIEGPGFTGGNL 540
DB |||||
QY 481 CFLMODRRGTIPFFTWTHRSVDFFNTIDAETITQLPVVKAYALSSGASIIIEGPGFTGGNL 540
DB |||||
QY 541 LFLKSSNSIAKFKVTLNSAALLQRYRVRIRYASTNLRFLVQNSNDFLVIYINKTNK 600
DB |||||
QY 541 LFLKSSNSIAKFKVTLNSAALLQRYRVRIRYASTNLRFLVQNSNDFLVIYINKTNK 600
DB |||||
QY 601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652
DB |||||
QY 601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652
DB |||||
RESULT 42
AAY23208
ID AAY23208 standard; protein; 653 AA.
XX
XX AC AAY23208;
XX
XX DT 24-AUG-1999 (first entry)
XX
XX DE Amino acid sequence of plantized Cry3Bb.11231 polypeptide.
XX
XX KW Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
KW coleoptera; southern corn rootworm; western corn root worm;
KW Diabrotica undecimpunctata howardi Barber; transgenic plant;
KW Diabrotica virgifera virgifera LeConte; insecticide resistance.
XX
XX OS Synthetic.
XX OS Bacillus thuringiensis.
XX PN WO9931248-A1.
XX
XX PD 24-JUN-1999.
XX
XX PF 17-DEC-1998; 98WO-US026852.
XX
XX PR 18-DEC-1997; 97US-00993170.
PR 18-DEC-1997; 97US-00993722.
PR 18-DEC-1997; 97US-00993775.
PR 18-DEC-1997; 97US-00996441.
XX
XX PA (ECOG-) ECOGEN INC.
PA (MONS ) MONSANTO CO.
XX
XX English L, Brussock SM, Malvar TM, Bryson JW, Kulesza CA;
PI Walters FS, Slatin SL, Von Tersch MA, Romano C;
XX
XX WPI; 1999-395184/33.
XX
XX Insecticidal Bacillus thuringiensis proteins.
XX
XX Claim 39; Page 484-486; 512pp; English.
XX
XX AAY23172-Y23206, and AAY23208-X23209 represent new Bacillus thuringiensis
CC Cry3Bb mutant proteins. The specification also describes methods of
CC altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
CC polypeptide was modified to have improved insecticidal activity or
CC enhanced insecticidal specificity against a target insect. The
CC modification comprises at least one amino acid substitution, addition, or
CC deletion in the primary sequence of the native or unmodified Cry3Bb
CC polypeptide, wherein the substitution or deletion occurs at a position
CC corresponding to from about amino acids 1-365 of the unmodified
CC polypeptide sequence (AAY23207 represents the wild type Cry3Bb protein).
CC The polypeptide can be used to kill coleopteran pests, especially by
```


CC application to the environment. It is especially useful against southern
 CC corn rootworm and western corn root worm, (Diabrotica undecimpunctata
 CC howardi Barber, and Diabrotica virgifera virgifera LeConte respectively).
 CC The mutant cry3Bb polynucleotides can also be used to produce transgenic
 CC plants with increased insecticide resistance

XX SQ Sequence 653 AA;

Query Match 99.1%; Score 3377; DB 2; Length 653;
 Best Local Similarity 99.4%; Pred. No. 2e-274;
 Matches 647; Conservative 1; Mismatches 3; Indels 0; Gaps 0;

QY 2 NPNRSEHDTIKVTPNSELTQNHQYPLADNPSTLEELNYKEFLRMTESSSTEVLNDST 61
 DB 3 NPNRSEHDTIKVTPNSELTQNHQYPLADNPSTLEELNYKEFLRMTESSSTEVLNDST 62

QY 62 VKDAVGTGISVVGQILGVGVPFAGALTSFYQSFLNTIWPSPADPWKAFMAQVEVLIDKK 121
 DB 63 VKDAVGTGISVVGQILGVGVPFAGALTSFYQSFLNTIWPSPADPWKAFMAQVEVLIDKK 122

QY 122 IEYAKSKALAEQLQGNFEDYVNALNSWKKTPLSLRSKRSQDRIRLFSQAESHFRNS 181
 DB 123 IEYAKSKALAEQLQGNFEDYVNALNSWKKTPLSLRSKRSQDRIRLFSQAESHFRNS 182

QY 182 MPSFAVSKFEVLFLPTTQAANTHLLKDAQVGEWGYSSSDVAEFYHRQLKLTQQYT 241
 DB 183 MPSFAVSKFEVLFLPTTQAANTHLLKDAQVGEWGYSSSDVAEFYHRQLKLTQQYT 242

QY 242 DHCNVNMYNGLRGSTYDAWVKFNRFREMTLTVLDLIVLPPFYDIRLYSGVKTELT 301
 DB 243 DHCNVNMYNGLRGSTYDAWVKFNRFREMTLTVLDLIVLPPFYDIRLYSGVKTELT 302

QY 302 RDIFTDPIFSLNTLOEYGPFTLSIENIRKPHLFDYLQIEFHTRLQPGYFGKDSFNYS 361
 DB 303 RDIFTDPIFSLNTLOEYGPFTLSIENIRKPHLFDYLQIEFHTRLQPGYFGKDSFNYS 362

QY 362 GNYVETRPSIGSSKTIITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAPNGKVYLG 421
 DB 363 GNYVETRPSIGSSKTIITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAPNGKVYLG 422

QY 422 TKVDFSQYDDQKNETSTQTYDSKRNGHVSQAQSIDQLPETTDEPLEKAYSHQLNYAEC 481
 DB 423 TKVDFSQYDDQKNETSTQTYDSKRNGHVSQAQSIDQLPETTDEPLEKAYSHQLNYAEC 482

QY 482 FLMDRRGTIPFTTWTTHRSVDFNTIDAETITQLPVVKAYALSSGASIIEGPGFTGNLL 541
 DB 483 FLMDRRGTIPFTTWTTHRSVDFNTIDAETITQLPVVKAYALSSGASIIEGPGFTGNLL 542

QY 542 FLKSSNSIAKFKVTLSAALLQRYRIRYASTTNLRLFVQNSNNDFLVIYINKTMNKD 601
 DB 543 FLKSSNSIAKFKVTLSAALLQRYRIRYASTTNLRLFVQNSNNDFLVIYINKTMNKD 602

QY 602 DDLTYQTFDLATNNSMGFGSKNELIIGAESFVSNEKIYIDKIEFIPVOL 652
 DB 603 DDLTYQTFDLATNNSMGFGSKNELIIGAESFVSNEKIYIDKIEFIPVOL 653

RESULT 43

AA70444

ID AA70444 standard; protein; 653 AA.

XX

AC AA70444;

XX

DT 21-JUN-2000 (first entry)

XX

DE Bacillus thuringiensis delta-endotoxin Cry3Bb variant v11231.

XX

KW delta-endotoxin; Cry3B; Bt toxin; crystal protein; insect pest;

KW insecticide; Coleopteran; expression cassette; transgenic plant;

XX Cry3Bb variant v11231.

XX

OS Bacillus thuringiensis.

OS Synthetic.

XX PN WC200011185-A2.
 PD 02-MAR-2000.
 XX PF 19-AUG-1999; 99WO-US018883.
 XX PR 19-AUG-1998; 98US-0097150P.
 XX PA (MONS) MONSANTO CO.
 XX PI Romano CP;
 DR WPI; 2000-246568/21.
 DR N-PSDB; AA251638, AA251641, AA251642, AA251655, AA251656.
 XX Novel expression cassettes which express Bacillus thuringiensis Cry3
 PT delta-endotoxin portion which is toxic to coleopteran insect pests,
 PT useful for producing transgenic plants with improved insecticidal
 PT activity.
 XX Claim 6; Page 106-108; 171pp; English.
 XX The present sequence is a Bacillus thuringiensis delta-endotoxin Cry3Bb
 CC variant AA11231 which is toxic to Coleopteran insect pests. The coding
 CC sequence of this protein is used in an expression cassette that provides
 CC improved expression of Cry3B or Cry3B variant proteins in transgenic
 CC plants e.g. maize. Transgenic plants expressing higher levels of Cry3B
 CC proteins exhibit increased insecticidal activity against Coleopteran
 CC pests
 XX SQ Sequence 653 AA;

Query Match 99.1%; Score 3377; DB 3; Length 653;
 Best Local Similarity 99.4%; Pred. No. 2e-274;
 Matches 647; Conservative 1; Mismatches 3; Indels 0; Gaps 0;

QY 2 NPNRSEHDTIKVTPNSELTQNHQYPLADNPSTLEELNYKEFLRMTESSSTEVLNDST 61
 DB 3 NPNRSEHDTIKVTPNSELTQNHQYPLADNPSTLEELNYKEFLRMTESSSTEVLNDST 62

QY 62 VKDAVGTGISVVGQILGVGVPFAGALTSFYQSFLNTIWPSPADPWKAFMAQVEVLIDKK 121
 DB 63 VKDAVGTGISVVGQILGVGVPFAGALTSFYQSFLNTIWPSPADPWKAFMAQVEVLIDKK 122

QY 122 IEYAKSKALAEQLQGNFEDYVNALNSWKKTPLSLRSKRSQDRIRLFSQAESHFRNS 181
 DB 123 IEYAKSKALAEQLQGNFEDYVNALNSWKKTPLSLRSKRSQDRIRLFSQAESHFRNS 182

QY 182 MPSFAVSKFEVLFLPTTQAANTHLLKDAQVGEWGYSSSDVAEFYHRQLKLTQQYT 241
 DB 183 MPSFAVSKFEVLFLPTTQAANTHLLKDAQVGEWGYSSSDVAEFYHRQLKLTQQYT 242

QY 242 DHCNVNMYNGLRGSTYDAWVKFNRFREMTLTVLDLIVLPPFYDIRLYSGVKTELT 301
 DB 243 DHCNVNMYNGLRGSTYDAWVKFNRFREMTLTVLDLIVLPPFYDIRLYSGVKTELT 302

QY 302 RDIFTDPIFSLNTLOEYGPFTLSIENIRKPHLFDYLQIEFHTRLQPGYFGKDSFNYS 361
 DB 303 RDIFTDPIFSLNTLOEYGPFTLSIENIRKPHLFDYLQIEFHTRLQPGYFGKDSFNYS 362

QY 362 GNYVETRPSIGSSKTIITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAPNGKVYLG 421
 DB 363 GNYVETRPSIGSSKTIITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAPNGKVYLG 422

QY 422 TKVDFSQYDDQKNETSTQTYDSKRNGHVSQAQSIDQLPETTDEPLEKAYSHQLNYAEC 481
 DB 423 TKVDFSQYDDQKNETSTQTYDSKRNGHVSQAQSIDQLPETTDEPLEKAYSHQLNYAEC 482

QY 482 FLMDRRGTIPFTTWTTHRSVDFNTIDAETITQLPVVKAYALSSGASIIEGPGFTGNLL 541
 DB 483 FLMDRRGTIPFTTWTTHRSVDFNTIDAETITQLPVVKAYALSSGASIIEGPGFTGNLL 542

QY 542 FLKSSNSIAKFKVTLNSAALLQRYVRIRYASTTNLRFLVQNSNDDFLVIYINKTMKD 601
DB |||||||
543 FLKSSNSIAKFKVTLNSAALLQRYVRIRYASTTNLRFLVQNSNDDFLVIYINKTMKD 602
QY 602 DDLTYQTDFLATTNSNMGFSGDKNELIIGAESFVSNKEIYIDKIEFIPVQL 652
DB |||||||
603 DDLTYQTDFLATTNSNMGFSGDKNELIIGAESFVSNKEIYIDKIEFIPVQL 653

RESULT 44
ABU09195
ID ABU09195 standard; protein; 653 AA.
XX
AC ABU09195;
XX
DT 12-JUN-2003 (first entry)
XX
DE Bacillus thuringiensis delta endotoxin Cry3Bbv11231.
XX
XX Cry3Bbv11231; delta-endotoxin; plant; transgenic; insecticide; crystal 3;
KW Cry3; Coleopteran insect infestation; increased toxicity;
KW season long protection; beetle.
XX
OS Bacillus thuringiensis.
OS Synthetic.
XX
XX US6501009-B1.
PN
XX 31-DEC-2002.
XX
XX 19-AUG-1999; 99US-00377466.
XX
XX 19-AUG-1999; 99US-00377466.
XX
XX (MONS) MONSANTO TECHNOLOGY LLC.
XX
XX Romano CP;
PI
XX WPI; 2003-352192/33.
DR N-P8DB; ABX95182.
XX
XX New modified polynucleotide useful for controlling Coleopteran insect
PT infestation in a field of crop plants encodes insecticidal crystal 3
PT Bacillus thuringiensis delta-endotoxin.
XX
XX Example 2; Col 73-78; 107pp; English.
PS
XX The invention relates to a modified polynucleotide which encodes an
CC insecticidal crystal 3 (Cry3) Bacillus thuringiensis delta-endotoxin such
CC as CryBb. The modified polynucleotide is useful for producing a
CC transformed cell, by introducing the modified polynucleotide into a cell
CC such as a plant cell (preferably a maize cell) or a microbial cell. The
CC modified polynucleotide is useful for producing a transformed maize plant
CC by introducing the modified polynucleotide into a maize plant cell,
CC selecting a transformed maize plant cell and regenerating a maize plant
CC from the transformed maize plant cell. A transgenic plant expressing the
CC modified polynucleotide is useful for controlling Coleopteran insect
CC infestation in a field of crop plants. The modified polynucleotide is
CC useful for producing transgenic plants expressing higher levels of the
CC insect controlling B. thuringiensis delta-endotoxin. The modified
CC polynucleotide provides up to 10 fold higher levels of insect controlling
CC delta-endotoxin relative to the highest levels obtained using prior
CC compositions. In particular, transgenic maize expressing higher levels of
CC the Cry3Bb protein designed to exhibit increased toxicity toward
CC Coleopteran pests deliver superior levels of insect protection and are
CC less likely to sponsor development of populations of target insects that
CC are resistant to the insecticidally active protein. Improved control of
CC susceptible target insect pests and season long protection from insect
CC pathogens is achieved using the modified polynucleotide. The modified
CC polynucleotide reduces the number of transgenic events that have to be
CC screened in order to identify one which contains beneficial levels of one
CC or more insect controlling compositions. The present sequence represents
CC the amino acid sequence of Bacillus thuringiensis delta endotoxin

CC Cry3Bbv11231
XX
SQ Sequence 653 AA;
Query Match
Best Local Similarity 99.1%; Score 3377; DB 6; Length 653;
Matches 647; Conservative 1; Mismatches 3; Indels 0; Gaps 0;
QY 2 NPNRSEHDTIKVTPNSELOTNHNQYPLADNPSTLEELNYKEFLRMTEDSTEVLDNST 61
DB |||||||
3 NPNRSEHDTIKVTPNSELOTNHNQYPLADNPSTLEELNYKEFLRMTEDSTEVLDNST 62
QY 62 VKDAVGTCISVVGQILGVGVPPFAGALTSTFYQSFLNTIWPDSADPWKAFMAQVEVLIDKK 121
DB |||||||
63 VKDAVGTCISVVGQILGVGVPPFAGALTSTFYQSFLNTIWPDSADPWKAFMAQVEVLIDKK 122
QY 122 IEEYAKSKALAELOQLQNNFEDYVNALNSWKKTPLSLRSKSQDRIRLFSQAESHFRNS 181
DB |||||||
123 IEEYAKSKALAELOQLQNNFEDYVNALNSWKKTPLSLRSKSQDRIRLFSQAESHFRNS 182
QY 182 MPFAVSKFEVLFLPTAAANTHLLLLKDAQVGEWGYSSYEDVAEYHRLKLTQQYT 241
DB |||||||
183 MPFAVSKFEVLFLPTAAANTHLLLLKDAQVGEWGYSSYEDVAEYHRLKLTQQYT 242
QY 242 DHCYNNVNVGLNGLRGSTYDAWKFNRFRREMTLTVDLIVLFPFYDIRLYSKGVKTELT 301
DB |||||||
243 DHCYNNVNVGLNGLRGSTYDAWKFNRFRREMTLTVDLIVLFPFYDIRLYSKGVKTELT 302
QY 302 RDIPTDPIFSLNTLOEYGTPTFLSIENSIRKPHLFYDLQIGIEFHTRLOQGYFGKDSFNYS 361
DB |||||||
303 RDIPTDPIFSLNTLOEYGTPTFLSIENSIRKPHLFYDLQIGIEFHTRLOQGYFGKDSFNYS 362
QY 362 GNYVETRESIGSSKTIITSPFYGDKSTEPVKLSPDGQKVYRTIANTDVAAMPNGKVYLG 421
DB |||||||
363 GNYVETRESIGSSKTIITSPFYGDKSTEPVKLSPDGQKVYRTIANTDVAAMPNGKVYLG 422
QY 422 TKVDFSOYDDQKNETSTQTYDSKRNNGHVSAQSDIDQLPETTTDFPLEKAYSHQLNYAEC 481
DB |||||||
423 TKVDFSOYDDQKNETSTQTYDSKRNNGHVSAQSDIDQLPETTTDFPLEKAYSHQLNYAEC 482
QY 482 FLMDRRGTIPFFTWTHRSVDFPNTIDAETITQLPVVKAYALSSGASIIEGPGFTGGNLL 541
DB |||||||
483 FLMDRRGTIPFFTWTHRSVDFPNTIDAETITQLPVVKAYALSSGASIIEGPGFTGGNLL 542
QY 542 FLKSSNSIAKFKVTLNSAALLQRYVRIRYASTTNLRFLVQNSNDDFLVIYINKTMKD 601
DB |||||||
543 FLKSSNSIAKFKVTLNSAALLQRYVRIRYASTTNLRFLVQNSNDDFLVIYINKTMKD 602
QY 602 DDLTYQTDFLATTNSNMGFSGDKNELIIGAESFVSNKEIYIDKIEFIPVQL 652
DB |||||||
603 DDLTYQTDFLATTNSNMGFSGDKNELIIGAESFVSNKEIYIDKIEFIPVQL 653

RESULT 45
ABU09198
ID ABU09198 standard; protein; 653 AA.
XX
AC ABU09198;
XX
DT 12-JUN-2003 (first entry)
XX
DE Bacillus thuringiensis delta endotoxin Cry3Bbv11231.
KW Cry3Bbv11231; delta-endotoxin; plant; transgenic; insecticide;
KW crystal 3; Cry3; Coleopteran insect infestation; increased toxicity;
KW season long protection; beetle.
XX
OS Bacillus thuringiensis.
OS Synthetic.
XX
PN US6501009-B1.
XX
PD 31-DEC-2002.

XX PF 19-AUG-1999; 99US-00377466.
 XX PR 19-AUG-1999; 99US-00377466.
 XX PA (MONS) MONSANTO TECHNOLOGY LLC.
 XX PI Romano CP;
 XX DR WPI; 2003-352192/33.
 XX DR N-PSDB; ABX95185, ABX95186, ABX95199, ABX95200.
 XX PT New modified polynucleotide useful for controlling Coleopteran insect
 PT infestation in a field of crop plants encodes insecticidal crystal 3
 PT Bacillus thuringiensis delta-endotoxin.
 XX PS Disclosure; Col 101-104; 107pp; English.
 XX CC The invention relates to a modified polynucleotide which encodes an
 CC insecticidal crystal 3 (Cry3) Bacillus thuringiensis delta-endotoxin such
 CC as Cry3Bb. The modified polynucleotide is useful for producing a
 CC transformed cell, by introducing the modified polynucleotide into a cell
 CC such as a plant cell (preferably a maize cell) or a microbial cell. The
 CC modified polynucleotide is useful for producing a transformed maize plant
 CC by introducing the modified polynucleotide into a maize plant cell,
 CC selecting a transformed maize plant cell and regenerating a maize plant
 CC from the transformed maize plant cell. A transgenic plant expressing the
 CC modified polynucleotide is useful for controlling Coleopteran insect
 CC infestation in a field of crop plants. The modified polynucleotide is
 CC useful for producing transgenic plants expressing higher levels of the
 CC insect controlling B. thuringiensis delta-endotoxin. The modified
 CC polynucleotide provides up to 10 fold higher levels of insect controlling
 CC delta-endotoxin relative to the highest levels obtained using prior
 CC compositions. In particular, transgenic maize expressing higher levels of
 CC the Cry3Bb protein designed to exhibit increased toxicity toward
 CC Coleopteran pests deliver superior levels of insect protection and are
 CC less likely to sponsor development of populations of target insects that
 CC are resistant to the insecticidally active protein. Improved control of
 CC susceptible target insect pests and season long protection from insect
 CC pathogens is achieved using the modified polynucleotide. The modified
 CC polynucleotide reduces the number of transgenic events that have to be
 CC screened in order to identify one which contains beneficial levels of one
 CC or more insect controlling compositions. The present sequence represents
 CC the amino acid sequence of Bacillus thuringiensis delta endotoxin
 CC Cry3Bb1v1231
 XX CC
 XX SQ Sequence 653 AA;

Query Match 99.1%; Score 3377; DB 6; Length 653;
 Best Local Similarity 99.4%; Pred. No. 2e-274;
 Matches 647; Conservative 1; Mismatches 3; Indels 0; Gaps 0;

QY 2 NPNRSEHDTIKVTPNSELTQNHQVPLADNPSTLEELNYKEFLRMTEDESSTEVLNDST 61
 DB 3 NPNRSEHDTIKVTPNSELTQNHQVPLADNPSTLEELNYKEFLRMTEDESSTEVLNDST 62
 QY 62 VKDAVGTGTSVGGIIGVGVPPAGALTSFYQSFLNTIWPSSDADPKAFMAQVEVLIDKK 121
 DB 63 VKDAVGTGTSVGGIIGVGVPPAGALTSFYQSFLNTIWPSSDADPKAFMAQVEVLIDKK 122
 QY 122 IEYAKSKALAEIQLQNNFEDVYNALNSWKKTPLSLRSKRSQDRIRLFQSAESHFRNS 181
 DB 123 IEYAKSKALAEIQLQNNFEDVYNALNSWKKTPLSLRSKRSQDRIRLFQSAESHFRNS 182
 QY 182 MPFSAVSKFEVLPLPTYAQAANTHLLLLKDAQVFGSEWGSSEDAVEFTHRQKLTKQOYT 241
 DB 183 MPFSAVSKFEVLPLPTYAQAANTHLLLLKDAQVFGSEWGSSEDAVEFTHRQKLTKQOYT 242
 QY 242 DHCNVNMYNGLNGLRGSTYDAWKFNFRREMTLTVLDLVLPPFYDIRLYSGVKTELT 301
 DB 243 DHCNVNMYNGLNGLRGSTYDAWKFNFRREMTLTVLDLVLPPFYDIRLYSGVKTELT 302
 QY 302 RDIFTDPIFSLNLTQBYGPTFLSIENSIRKPHLFDYLGQIEFHTRLQPGYFGKDSFNYS 361

DB 303 RDIFTDPIELLATLQKYGPTFLSIENSIRKPHLFDYLGQIEFHTRLQPGYFGKDSFNYS 362
 QY 362 GNYVETRPSIGSKTITSPFYGDKSTPEPVOKLSFDGQKYVRTIANTDVAAPNGKYVLGV 421
 DB 363 GNYVETRPSIGSKTITSPFYGDKSTPEPVOKLSFDGQKYVRTIANTDVAAPNGKYVLGV 422
 QY 422 TKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAEC 481
 DB 423 TKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAEC 482
 QY 482 FLMDRRGTIPFTTWRHSVDFNTIDAEKITQLPVPKAYALSSGASIIIEGPGFTGNLL 541
 DB 483 FLMDRRGTIPFTTWRHSVDFNTIDAEKITQLPVPKAYALSSGASIIIEGPGFTGNLL 542
 QY 542 FLKESNSIAKPKVTLSAALLQRYVRIRYASTTNLRLFVQNSNDELVIYINKTMNKD 601
 DB 543 FLKESNSIAKPKVTLSAALLQRYVRIRYASTTNLRLFVQNSNDELVIYINKTMNKD 602
 QY 602 DDLTYQTDFLATNTSNMGFGDKNELIIGAESFVSNEKIYIDKIEFIPVOL 652
 DB 603 DDLTYQTDFLATNTSNMGFGDKNELIIGAESFVSNEKIYIDKIEFIPVOL 653

RESULT 46
 ABW01053
 ID ABW01053 standard; protein; 653 AA.
 AC ABW01053;
 XX 15-JAN-2004 (first entry)
 XX Bacillus thuringiensis Cry3Bb-delta-endotoxin variant v11231 protein.
 DE Transgenic plant; Cry3Bb-delta-endotoxin; Coleopteran pest resistance;
 KW insecticide; variant.
 XX OS Bacillus thuringiensis.
 OS Synthetic.
 XX PN US2003115630-A1.
 XX 19-JUN-2003.
 PD 29-AUG-2002; 2002US-00232665.
 PF 19-AUG-1999; 99US-00377466.
 PR (ROMA/) ROMANO C P.
 XX Romano CP;
 PI WPI; 2003-810928/76.
 DR N-PSDB; AAD61786, AAD61789, AAD61790, AAD61803, AAD61804.
 XX New transgenic plant resistant to Coleopteran pests, comprises Bacillus
 PT thuringiensis Cry3-delta-endotoxin gene.
 XX Claim 6; Page 40-42; Opp; English.
 XX CC The invention relates to novel transgenic plants comprising Bacillus
 CC thuringiensis Cry3-delta-endotoxin gene or its variants having
 CC coleopteran inhibitory activity. The invention is useful for controlling
 CC Coleopteran insect infestation in a field of crop plants. The present
 CC sequence is B. thuringiensis Cry3Bb-delta-endotoxin variant protein
 XX SQ Sequence 653 AA;

Query Match 99.1%; Score 3377; DB 7; Length 653;
 Best Local Similarity 99.4%; Pred. No. 2e-274;
 Matches 647; Conservative 1; Mismatches 3; Indels 0; Gaps 0;

QY 2 NPNRSEHDTIKVTPNSELTQNHQVPLADNPSTLEELNYKEFLRMTEDESSTEVLNDST 61

Db 3 NPNRSEHDTIKVTPNSELQTNHNPYPLADNPSTLEELNYKEFLRMTEDSSTEVLDNST 62
QY 62 VKDAVGTGISVVGQILGVVGVFPAGALTSFYQSFLNTIWPSPADPWKAFMAQVEVLIDKK 121
Db 63 VKDAVGTGISVVGQILGVVGVFPAGALTSFYQSFLNTIWPSPADPWKAFMAQVEVLIDKK 122
QY 122 IEYAKSKALAELOGLQNNFEDYVVALNSWKKTPLSLRSKRSODRIRELFSQAESHFRNS 181
Db 123 IEYAKSKALAELOGLQNNFEDYVVALNSWKKTPLSLRSKRSODRIRELFSQAESHFRNS 182
QY 182 MPSFAVSKFEVLFLPTVAQAANTHLLLLKDAQVFGEEWGYSSSEDAEFYHRRQLKLTQQYT 241
Db 183 MPSFAVSKFEVLFLPTVAQAANTHLLLLKDAQVFGEEWGYSSSEDAEFYHRRQLKLTQQYT 242
QY 242 DHCNVWYVGLNGLRGSTYDAWVKFNRRPREMTLTVLDLIVLPPYDRLYLSKGVKTELT 301
Db 243 DHCNVWYVGLNGLRGSTYDAWVKFNRRPREMTLTVLDLIVLPPYDRLYLSKGVKTELT 302
QY 302 RDIFTDPIFSLNTLOEYGPFTLSIENSIRKPHLFDYLGIEFHTRLOPGYFGKDSFNYS 361
Db 303 RDIFTDPIFSLNTLOEYGPFTLSIENSIRKPHLFDYLGIEFHTRLOPGYFGKDSFNYS 362
QY 362 GNYVETRPSIGSSKTIITSPFYGDKSTPEPVQKLSFDGQKVYRTIANTDVAAPNGKVILGV 421
Db 363 GNYVETRPSIGSSKTIITSPFYGDKSTPEPVQKLSFDGQKVYRTIANTDVAAPNGKVILGV 422
QY 422 TKVDFSOYDDQKNETSTQTYDSKRNGHVSAQDSIDQLPPTTDEPLEKAYSHQLYAEC 481
Db 423 TKVDFSOYDDQKNETSTQTYDSKRNGHVSAQDSIDQLPPTTDEPLEKAYSHQLYAEC 482
QY 482 FLMQDRRGTIIPFTTWTTHRSVDFNTIDAETIKTQLPVKAYALSSGASIIIEGPGFTGNLL 541
Db 483 FLMQDRRGTIIPFTTWTTHRSVDFNTIDAETIKTQLPVKAYALSSGASIIIEGPGFTGNLL 542
QY 542 FLKESNSIAKPKVTLNSAALLQRYVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNKD 601
Db 543 FLKESNSIAKPKVTLNSAALLQRYVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNKD 602
QY 602 DDLTYQTDFLATNNSMGSGDKNELIIGAESFVSNKEIYIDKIEFIPVOL 652
Db 603 DDLTYQTDFLATNNSMGSGDKNELIIGAESFVSNKEIYIDKIEFIPVOL 653

RESULT 47
AAV23209
ID AAV23209 standard; protein; 652 AA.
XX AC AAV23209;
XX DT 24-AUG-1999 (first entry)
XX DE Amino acid sequence of Cry3Bb.11098 polypeptide.
XX KW Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
KW coleoptera; southern corn rootworm; western corn root worm;
KW Diabrotica undecimpunctata howardi Barber; transgenic plant;
KW Diabrotica virgifera vergifera LeConte; insecticide resistance.
XX OS Synthetic.
OS Bacillus thuringiensis.
XX PN W09931248-A1.
XX PD 24-JUN-1999.
XX PF 17-DEC-1998; 98WO-US026852.
XX PR 18-DEC-1997; 97US-00993170.
XX PR 18-DEC-1997; 97US-00993722.
XX PR 18-DEC-1997; 97US-00993775.
XX PR 18-DEC-1997; 97US-00996441.

PA (ECOG-) ECOGEN INC.
XX (MONS) MONSANTO CO.
PI English L, Brussock SM, Malvar TM, Bryson JW, Kulesza CA;
PI Walters FS, Slatin SL, Von Tersch NA, Romano C;
XX WPI; 1999-395184/33.
DR Insecticidal Bacillus thuringiensis proteins.
PT Claim 39; Page 492-494; 512pp; English.
XX AAV23172-Y23206, and AAV23208-X23209 represent new Bacillus thuringiensis
XX Cry3Bb mutant proteins. The specification also describes methods of
XX altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
XX polypeptide was modified to have improved insecticidal activity or
XX enhanced insecticidal specificity against a target insect. The
XX modification comprises at least one amino acid substitution, addition, or
XX deletion in the primary sequence of the native or unmodified Cry3Bb
XX polypeptide, wherein the substitution or deletion occurs at a position
XX corresponding to from about amino acids 1-365 of the unmodified
XX polypeptide sequence (AAV23207 represents the wild type Cry3Bb protein).
XX The polypeptide can be used to kill coleopteran pests, especially by
XX application to the environment. It is especially useful against southern
XX corn rootworm and western corn root worm, (Diabrotica undecimpunctata
XX howardi Barber, and Diabrotica virgifera vergifera LeConte respectively).
XX The mutant cry3Bb polynucleotides can also be used to produce transgenic
XX plants with increased insecticide resistance
SQ Sequence 652 AA;
Query Match 99.1%; Score 3375; DB 2; Length 652;
Best Local Similarity 99.2%; Pred. No. 3e-274;
Matches 647; Conservative 1; Mismatches 4; Indels 0; Gaps 0;
QY 1 MNPNNRSEHDTIKVTPNSELQTNHNPYPLADNPSTLEELNYKEFLRMTEDSSTEVLDNS 60
Db 1 MNPNNRSEHDTIKVTPNSELQTNHNPYPLADNPSTLEELNYKEFLRMTEDSSTEVLDNS 60
QY 61 TVKDAVGTGISVVGQILGVVGVFPAGALTSFYQSFLNTIWPSPADPWKAFMAQVEVLIDK 120
Db 61 TVKDAVGTGISVVGQILGVVGVFPAGALTSFYQSFLNTIWPSPADPWKAFMAQVEVLIDK 120
QY 121 KIEYAKSKALAELOGLQNNFEDYVVALNSWKKTPLSLRSKRSODRIRELFSQAESHFRN 180
Db 121 KIEYAKSKALAELOGLQNNFEDYVVALNSWKKTPLSLRSKRSODRIRELFSQAESHFRN 180
QY 181 SMPFSAVSKFEVLFLPTVAQAANTHLLLLKDAQVFGEEWGYSSSEDAEFYHRRQLKLTQQY 240
Db 181 SMPFSAVSKFEVLFLPTVAQAANTHLLLLKDAQVFGEEWGYSSSEDAEFYHRRQLKLTQQY 240
QY 241 TDHCNVWYVGLNGLRGSTYDAWVKFNRRPREMTLTVLDLIVLPPYDRLYLSKGVKTELT 300
Db 241 TDHCNVWYVGLNGLRGSTYDAWVKFNRRPREMTLTVLDLIVLPPYDRLYLSKGVKTELT 300
QY 301 TRDIFTDPIFSLNTLOEYGPFTLSIENSIRKPHLFDYLGIEFHTRLOPGYFGKDSFNYS 360
Db 301 TRDIFTDPIFSLNTLOEYGPFTLSIENSIRKPHLFDYLGIEFHTRLOPGYFGKDSFNYS 360
QY 361 SGNYVETRPSIGSSKTIITSPFYGDKSTPEPVQKLSFDGQKVYRTIANTDVAAPNGKVILG 420
Db 361 SGNYVETRPSIGSSKTIITSPFYGDKSTPEPVQKLSFDGQKVYRTIANTDVAAPNGKVILG 420
QY 421 VTKVDFSOYDDQKNETSTQTYDSKRNGHVSAQDSIDQLPPTTDEPLEKAYSHQLYAEC 480
Db 421 VTKVDFSOYDDQKNETSTQTYDSKRNGHVSAQDSIDQLPPTTDEPLEKAYSHQLYAEC 480
QY 481 CFLMQDRRGTIIPFTTWTTHRSVDFNTIDAETIKTQLPVKAYALSSGASIIIEGPGFTGNLL 540
Db 481 CFLMQDRRGTIIPFTTWTTHRSVDFNTIDAETIKTQLPVKAYALSSGASIIIEGPGFTGNLL 540
QY 541 LFLKESNSIAKPKVTLNSAALLQRYVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600
Db 541 LFLKESNSIAKPKVTLNSAALLQRYVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600

Db 541 LFLKSSNSIAKFKVTLNSAALLQRYVRIRYASTTNLRLFVQNSNDFLVIYINKTMNK 600
QY 601 DDDLTYOTFDLATTNSNMFGSKNELIIGAESPVSNEKIYIDKIEPIPVOL 652
Db 601 DDDLTYOTFDLATTNSNMFGSKNELIIGAESPVSNEKIYIDKIEPIPVOL 652
RESULT 48
ID AAY70446
XX AAY70446 standard; protein; 653 AA.
AC AAY70446;
XX 21-JUN-2000 (first entry)
DT 21-JUN-2000 (first entry)
XX Bacillus thuringiensis delta-endotoxin Cry3Bb variant 11231mv2.
DE delta-endotoxin; Cry3B; Bt toxin; crystal protein; insect pest;
XX insecticide; Coleopteran; expression cassette; transgenic plant;
KW Cry3Bb variant 11231mv2.
KW Bacillus thuringiensis.
XX Synthetic.
OS
XX WO200011185-A2.
PN 19-AUG-1999; 99WO-US018883.
XX 02-MAR-2000.
PD 19-AUG-1998; 98US-0097150P.
XX (MONS) MONSANTO CO.
PA Romano CP;
PI
XX WPI; 2000-246568/21.
DR N-PSDB; AA251640, AA251645, AA251646.
XX Novel expression cassettes which express Bacillus thuringiensis Cry3
PT delta-endotoxin portion which is toxic to coleopteran insect pests,
PT useful for producing transgenic plants with improved insecticidal
PT activity.
XX Claim 6; Page 116-118; 171pp; English.
PS
XX The present sequence is a Bacillus thuringiensis delta-endotoxin Cry3Bb
CC variant 11231mv2 which is toxic to Coleopteran insect pests. The coding
CC sequence of this protein is used in an expression cassette that provides
CC improved expression of Cry3B or Cry3B variant proteins in transgenic
CC plants e.g. maize. Transgenic plants expressing higher levels of Cry3B
CC proteins exhibit increased insecticidal activity against Coleopteran
CC pests
XX
SQ Sequence 653 AA;
Query Match 99.0%; Score 3373; DB 3; Length 653;
Best Local Similarity 99.2%; Pred. No. 4.4e-274;
Matches 646; Conservative 2; Mismatches 3; Indels 0; Gaps 0;
QY 2 NPNRSEHDTIKVTPNSELOTNHNQYPLADNPNTLEELNYKEFLRMTEDSSTEVLNDST 61
Db 3 NPNRSEHDTIKVTPNSELOTNHNQYPLADNPNTLEELNYKEFLRMTEDSSTEVLNDST 62
QY 62 VKDAVGTGISVVGQILGWGVPPAGALTSPYQSFNTIPSPDADPWKAFMAQVEVLIDKK 121
Db 63 VKDAVGTGISVVGQILGWGVPPAGALTSPYQSFNTIPSPDADPWKAFMAQVEVLIDKK 122
QY 122 IEEYAKSKALAEQLQGNFEDYVNALNSWKKTPLSLRSKRSQDRIRLPSQAESHFNS 191
Db 123 IEEYAKSKALAEQLQGNFEDYVNALNSWKKTPLSLRSKRSQDRIRLPSQAESHFNS 192
QY 182 MPFAVSKFEVLFLPTVAQAANTHLLLLKDAQVFGBEWGYSSSDVAEFYRQLKLTQOYT 241

Db 183 MPFAVSKFEVLFLPTVAQAANTHLLLLKDAQVFGBEWGYSSSDVAEFYRQLKLTQOYT 242
QY 242 DHCWNNYVGLNGLRGSTYDAWVKFNRFREMTLTVDLVLVLPFFVDIRLYSKGVKTELT 301
Db 243 DHCWNNYVGLNGLRGSTYDAWVKFNRFREMTLTVDLVLVLPFFVDIRLYSKGVKTELT 302
QY 302 RDIFTDPIFSLNTLOEYGTFFLSIENSIRKPHLFDYLOGIEFHTRLQPGYFGKDSFNYS 361
Db 303 RDIFTDPIFSLNTLOEYGTFFLSIENSIRKPHLFDYLOGIEFHTRLQPGYFGKDSFNYS 362
QY 362 GNYVETRPISGSKTITSPFYGDKSTEPVQKLSFDGQKVYRTTANTDVAAPNGKVYLG 421
Db 363 GNYVETRPISGSKTITSPFYGDKSTEPVQKLSFDGQKVYRTTANTDVAAPNGKVYLG 422
QY 422 TKVDFSOYDDOKNETSTQYVDSKRNGHVSQAQDSIDOLPETTDEPLEKAYSHOLNVAEC 481
Db 423 TKVDFSOYDDOKNETSTQYVDSKRNGHVSQAQDSIDOLPETTDEPLEKAYSHOLNVAEC 482
QY 482 FLMDRRGTIPFFTWTHRSVDFNTIDAETITOLPVVKAYALSSGASIIEGPGFTGNLL 541
Db 483 FLMDRRGTIPFFTWTHRSVDFNTIDAETITOLPVVKAYALSSGASIIEGPGFTGNLL 542
QY 542 FLKESNSIAKFKVTLNSAALLQRYVRIRYASTTNLRLFVQNSNDFLVIYINKTMNKD 601
Db 543 FLKESNSIAKFKVTLNSAALLQRYVRIRYASTTNLRLFVQNSNDFLVIYINKTMNKD 602
QY 602 DDLTYOTFDLATTNSNMFGSKNELIIGAESPVSNEKIYIDKIEPIPVOL 652
Db 603 DDLTYOTFDLATTNSNMFGSKNELIIGAESPVSNEKIYIDKIEPIPVOL 653
RESULT 49
ABU09197
ID ABU09197 standard; protein; 653 AA.
XX ABU09197;
XX 12-JUN-2003 (first entry)
DT 12-JUN-2003 (first entry)
XX Bacillus thuringiensis delta endotoxin Cry3Bb 11231mv2.
DE Cry3Bb 11231mv2; delta-endotoxin; plant; transgenic; insecticide;
KW crystal 3; Cry3; Coleopteran insect infestation; increased toxicity;
XX season long protection; beetle.
XX Bacillus thuringiensis.
OS Synthetic.
XX US6501009-B1.
PN 31-DEC-2002.
PD 19-AUG-1999; 99US-00377466.
XX 19-AUG-1999; 99US-00377466.
XX (MONS) MONSANTO TECHNOLOGY LLC.
PA Romano CP;
PI WPI; 2003-352192/33.
XX N-PSDB; ABX95184.
XX New modified polynucleotide useful for controlling Coleopteran insect
PT infestation in a field of crop plants encodes insecticidal crystal 3
PT Bacillus thuringiensis delta-endotoxin.
XX Disclosure; Fig 6; 107pp; English.
PS The invention relates to a modified polynucleotide which encodes an
XX insecticidal crystal 3 (Cry3) Bacillus thuringiensis delta-endotoxin such
CC as CryBb. The modified polynucleotide is useful for producing a

		Matches 646; Conservative		2; Mismatches		3; Indels		0; Gaps		0;	
Qy	2	NPNRSEHDTIKVTPNSELOTHNQYPLADNPSTLEELNKKFRLMTEDSSTEVLNST		61							
Db	3	NPNRSEHDTIKVTPNSELOTHNQYPLADNPSTLEELNKKFRLMTEDSSTEVLNST		62							
Qy	62	VKDAVGTGISVVGQILGVGVPFAGALTSFYQSFPLNTIPSDADPWKAFMAQVEVLIDKK		121							
Db	63	VKDAVGTGISVVGQILGVGVPFAGALTSFYQSFPLNTIPSDADPWKAFMAQVEVLIDKK		122							
Qy	122	IEEYAKSKALAELOGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHPFNS		181							
Db	123	IEEYAKSKALAELOGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHPFNS		182							
Qy	182	MPSFAVSKFEVLFLPTVAQAANTHLLKDAQVFGGEWYSSSEDVAEFYHRLKLTQOYT		241							
Db	183	MPSFAVSKFEVLFLPTVAQAANTHLLKDAQVFGGEWYSSSEDVAEFYHRLKLTQOYT		242							
Qy	242	DHCNWNVNGLGRGSTDYDAWKFNRRFREMILTVDLIVLFFPYDIRLYSKGVKTELT		301							
Db	243	DHCNWNVNGLGRGSTDYDAWKFNRRFREMILTVDLIVLFFPYDIRLYSKGVKTELT		302							
Qy	302	RDIPTDIPSLNLOEYGPFTLSIENSIRKPHLFDYLOQIEFHTRLQPGYFGKDSFNYS		361							
Db	303	RDIPTDIPSLNLOEYGPFTLSIENSIRKPHLFDYLOQIEFHTRLQPGYFGKDSFNYS		362							
Qy	362	GNVETRPSIGSSKTIITSPYGDKSTEPVOKLSFDGQKVYRTIANTDVAAPNGKVYLV		421							
Db	363	GNVETRPSIGSSKTIITSPYGDKSTEPVOKLSFDGQKVYRTIANTDVAAPNGKVYLV		422							
Qy	422	TKVDFSQYDDQKNETSTQTYDSKRNNGHVSQAQDSIDQLPETTTDEPLEKAYSHQLNYAEC		481							
Db	423	TKVDFSQYDDQKNETSTQTYDSKRNNGHVSQAQDSIDQLPETTTDEPLEKAYSHQLNYAEC		482							
Qy	482	FLMQDRRGITIPFTWTHRSVDFPNTIDAEEKITQLPVVKAYALSSGASIIIEGPGFTGNNLL		541							
Db	483	FLMQDRRGITIPFTWTHRSVDFPNTIDAEEKITQLPVVKAYALSSGASIIIEGPGFTGNNLL		542							
Qy	542	FLKESNSIAKFKVTLSAALLQRYRIRYASTTNLRLFVQNSNNDFLVIYINKTMNKD		601							
Db	543	FLKESNSIAKFKVTLSAALLQRYRIRYASTTNLRLFVQNSNNDFLVIYINKTMNKD		602							
Qy	602	DDLTYQTDFDLATTSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVOL		652							
Db	603	DDLTYQTDFDLATTSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVOL		653							

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Job time : 181 secs

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